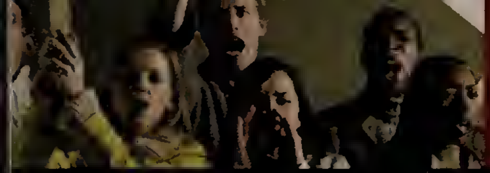

High-tech labor dispute: Workers at IBM use an online petition to protest salary cuts made after a lawsuit forced the vendor to pay them overtime. PAGE 6

COMPUTERWORLD®

TOP 12 GREEN-IT COMPANIES

They're turning green, from the data center to the desktop, with energy-saving strategies such as virtualization and videoconferencing. Learn how they're saving money while helping to save the environment. Page 29

MASTER

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FEBRUARY 18, 2008
VOL. 42, NO. 8 $5/COPY

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Meet a wizard whose sole purpose is to ease the lives of storage admins. PAGE 18

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BREAKING NEWS AT COMPUTERWORLD.COM

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COMPUTERWORLD ■ FEBRUARY 18, 2008

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16 BlackBerry Users Suffer Through Second System Upgrade Snafu. The latest service outage prompts calls for the use of multiple handheld devices and of delivery-failure notification systems.

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TOP 12 GREEN-IT COMPANIES

Computerworld identified 12 companies working hard to make their IT operations more eco-friendly.

30 Highmark (No. 1) uses air handlers to push cold air under the raised floor of its data center.

32 Discovery Communications (No. 2) conducts regular technology equipment audits and has reduced its server count from 850 machines to 535.

34 First National of Nebraska (No. 3) uses environmentally friendly fuel cells to power its data center.

37 Perkins+Will (No. 4) developed a "green operations plan" focused on office energy use.

38 The Snohomish Public Utility District (No. 5) uses customized software to put more than 1,000 desktops to sleep when they aren't in use.

40 World Wildlife Fund (No. 6) uses virtualization software and blade servers to reduce energy consumption.

42 Austin Energy (No. 7) runs 600 servers on just 150 physical machines through virtualization.

42 WellPoint (No. 8) moved its data center from California to Virginia, saving $13,000 a month.

43 Ryder System (No. 9) condensed 100 discrete Wintel servers into 66 Energy Star blades.

44 Marriott International (No. 10) is building a naturally cooled data center in a former mine.

44 Monsanto (No. 11) recently completed a $21 million data center in Creve Coeur, Mo., that was built to be green.

46 Wachovia (No. 12) rolled 15 unique reporting tools into a single managed-service environment.

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30 How We Determined the Top 12. A look at the criteria and process used to choose the Top 12 Green-IT Companies and the top 12 vendors.

36 The Top 12 Green-IT Vendors. The vendors and data center suppliers working to make their IT operations and equipment more energy-efficient.

47 The Green Maze. Our "Green Dozen" are doing things right, but going green isn't easy. It gets complicated when you try to adopt an overall green strategy and master issues like renewable energy and responsible recycling.

ONLINE FEATURES

COMPUTERWORLD.COM/TOPGREEN

How Green Is Your Company?
Take our green-IT quiz and read about ways to get greener.

Data Centers Take the LEED
How two companies earned their credentials.

The Green IT Two-Step
Most IT managers follow conventional wisdom, adding capacity to do more business, says columnist Howard Rubin. But they should really be looking for the "right" capacity.

COVER PHOTOGRAPHY ISTOCKPHOTO

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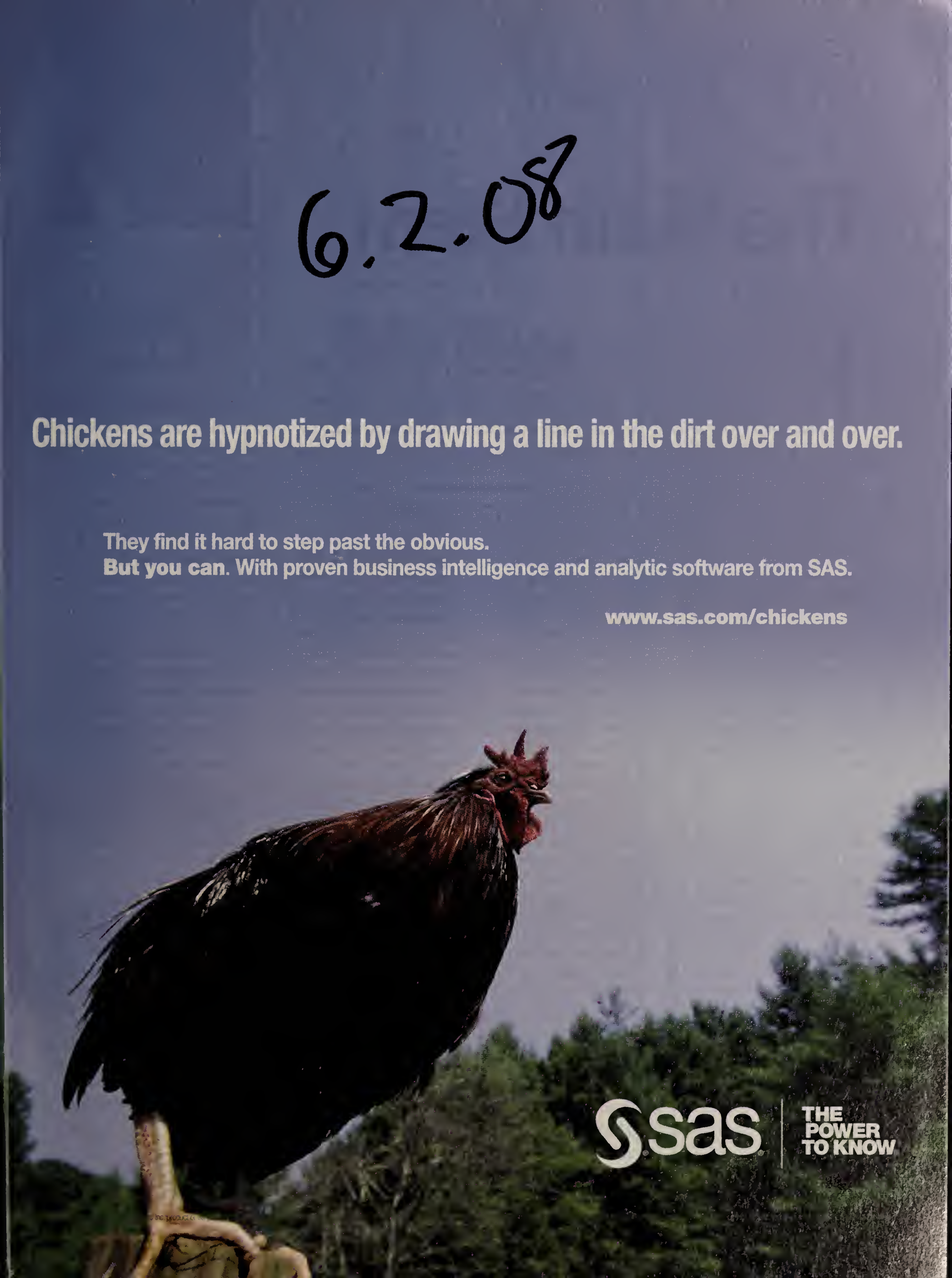

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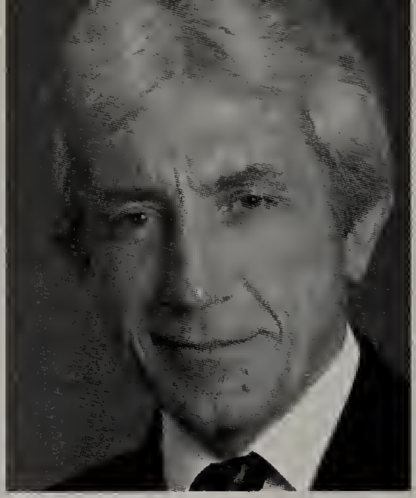
EDITOR'S NOTE

Don Tennant



The Main Stem

IN MY Editor's Note last week, I wrote about what I called the "green pall" that has settled over the IT community. I explained that the pall stems from a backlash to the frenzy that the green IT topic is creating, and I stressed that the backlash needs to be overcome. I noted that the reason why would be apparent in our special report this week, "*Computerworld*'s Top 12 Green IT Companies."

It's important to acknowledge that my observation of the pall is far from a revelation. The phenomenon is, in fact, being fairly widely discussed. Gartner calls it "green fatigue" and predicts that it won't be alleviated anytime soon.

"We certainly anticipate green IT going through the phases of a Hype Cycle, like any other issue or technology," Gartner said in a report released in December. "The marketing departments of technology and service providers are touting whatever products they have as green. Although some of this is genuine, or at least well intended, much of the hype is a cynical attempt to jump on the bandwagon without actually addressing fundamental issues. Unfortunately, this situation will get much worse before it gets better."

It's encouraging that the hype factor is being recognized and discussed. And it's especially noteworthy that one of the most intelligent explanations of the phenomenon that I've seen was provided by, of all people, a marketing executive at a big IT vendor.

Dick Sullivan, a senior marketing manager at storage giant EMC, wrote about it in his personal blog, "Energy Matters," last October. In a posting titled "What color is green?" Sullivan offered this opening line: "I don't like the term 'green IT.'

"You can use it with a dozen people and conjure a dozen different ideas," he wrote. "Now, a whole set of discussions around 'green' [has] already started a backlash from customers feeling that the whole deal is just marketing hype, or 'greenwashing.' " Sullivan wrote that he avoids using the term because it can be misleading.

"To a data center manager, efficient IT is the real objective," he wrote. "If by consolidating and virtualizing and automating and optimizing they can save energy and help the environment, they will do that. But the primary benefit needs to be a more efficient IT operation that delivers business benefits and IT performance."

So Sullivan suggested that we think of it not as "green IT," but as "efficient IT" that delivers green. And he offered this definition: "IT and data center infrastructure suppliers working with corporate customers to change the design and deployment of computing environments to gain efficiency and cost savings, while meeting business objectives and reducing environmentally harmful impacts."

As sensible as that is, however, the reality is that the term *green IT* isn't going away. We just need to understand that green is the color it's always been: the color of money. We need to realize that it's OK to think of the positive environmental impact of green IT as an offshoot, and the cost savings as the main stem.

Think of the positive environmental impact of green IT as an offshoot, and the cost savings as the main stem.

It shouldn't be that hard. Why does the environmental friendliness that the moniker connotes make it so difficult to recognize the obvious economic benefits of green IT? Why do we need to pay IDC, a *Computerworld* sister company, the $4,500 it's asking for a report that found that "the No. 1 driver for green IT adoption is economic, to reduce operational costs"? Why did we need Gartner to issue a 2007 publication titled "Findings: Midsize Business 'Green IT' Initiatives Are Driven Mostly by Cost Savings"? If those conclusions aren't no-brainers, we can blame the green pall.

What we really need are companies that have demonstrated an ability to see through the pall, a determination to embrace green IT as smart business, and a willingness to share their stories of cost savings with their peers. We know they exist, because we found dozens of them. We invite you to learn, as we have, from the Top 12 featured in this week's special report. ■

Don Tennant *is editorial director of* Computerworld *and* InfoWorld. *Contact him at don_tennant@computerworld.com, and visit his blog at* http://blogs.computerworld.com/tennant.

A PM Framework for Disaster Recovery

Crises can be managed using project management processes ["Planning a Recovery That Isn't a Disaster," Security Manager's Journal, Jan. 21]. This understanding can help provide a framework for staffers to work through the complexities of planning for and managing a disaster recovery effort.

■ **Mark H. Brooks,** *Matthews, N.C.*

Iran's Engineers

We're not the problem, as Don Tennant had it in his Dec. 17 Editor's Note, "They Were Like Us." Iran's political and religious leaders are the ones perpetuating the "darkness" by not agreeing to the world community's demands on many issues, including, but not limited to, civil liberties, uranium enrichment and support of worldwide terrorism. Tennant's heartfelt support of the scientists and engineers working hard in their day-to-day lives to make life better is genuine, but their actions in avoiding the repercussions of their government can only exacerbate the problem.

Any technological achievements deriving from their hard work using sanctioned technology will only empower and enable the Iranian government to continue its restrictions on the lives and liberties of those scientists and engineers our world so desperately needs.

■ **Douglas Strunk,** *Philadelphia*

Microsoft-Yahoo Could Help Consumers

There are some analysts in Washington who take a different stance than the folks at EPIC ["Would a Microsoft-Yahoo Deal Out-Google Google?" *Computerworld.com*, Feb. 1]. The acquisition could prove to be great for consumers. Microsoft-Yahoo would be able to cut its margins, creating lower prices for advertisers and higher rates of return for content creators. This means a richer Internet for everyone. Also, the combined patent portfolios of the two companies, along with combined research teams, could result in many great new Web technologies.

■ **Cord Blomquist,** *analyst, Competitive Enterprise Institute, Washington, cblomquist@cei.org*

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Improve Your Data Center by Inspecting Your EPO Button

The data center's Emergency Power Off button is often a source of confusion and downtime. Here's what to do about the problem.

Police Tech: How Cops Use IT to Catch Bad Boys

Your local police department may not look like those on flashy TV shows, but it likely uses every available resource to get an edge in the battle against crime.

Is Online Reputation Management Ethical?

A bevy of companies claim that they can help corporations and individuals monitor and manage their online reputations. But are they crossing ethical boundaries by tinkering with Web search results?

The Best New Internet Hoaxes

Google TV. The Haiti UFO video. The "Metalosis Maligna" documentary. Come on, admit it – you've fallen for some of these recent blog- and video-based hoaxes yourself.

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News Digest

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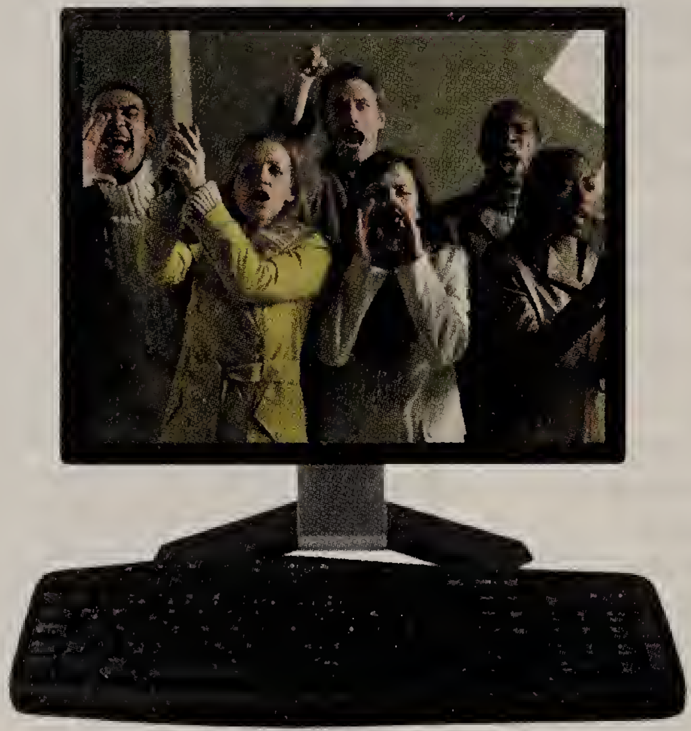
THE WEEK AHEAD

MONDAY: Fast Search & Transfer, an enterprise search engine vendor that is being acquired by Microsoft, starts its FASTforward '08 user conference in Orlando.

TUESDAY: Sybase is expected to announce a cluster edition of its Adaptive Server Enterprise database. Also, Hewlett-Packard plans to report its first-quarter financial results.

WEDNESDAY: The two-day RFID Smart Labels USA 2008 conference begins in Boston.



GETTY IMAGES

CAREERS

Salary Cuts Prompt Online Protest by IBM Tech Workers

LABOR PROTESTS by IT workers are rare, but IBM is in the midst of one that is unfolding entirely online.

Instead of waving protest signs outside company gates, some of the IBM employees affected by a 15% salary cut announced last month are voicing disappointment, anger and bitterness in comments posted as part of an online petition that was set up by a union.

As of last Friday, more than 1,200 people had signed the Alliance@IBM petition, which asks the company to restore the salaries of about 7,600 IT specialists, technical support staffers and other workers to their previous levels.

Many people added comments. For instance, one wrote, "Previous loyal employee . . . No more." Another wrote: "This is not fair. I did not deserve this after all my hard work."

The pay changes stem from a federal class-action lawsuit filed in early 2006 by some employees who complained that they weren't being paid overtime for working more than 40 hours a week. IBM settled the case for $65 million in back pay.

On Jan. 21, IBM said it was reclassifying the affected jobs as so-called nonexempt positions, making the workers eligible for overtime pay. But, it added, their base salaries would be cut by 15%.

The company characterized the changes as a "pay remix" in PowerPoint slides sent to managers and then leaked to the public. IBM said the salary cut will be offset by overtime pay and by a payment to people who don't work enough hours to make up the difference.

IBM spokesman Fred McNeese said that IBM's previous salaries were consistent with industry levels and claimed that adding overtime would have left the company in an uncompetitive position.

Two affected employees who asked not to be identified disputed IBM's claim that their overall pay would be similar. They said overtime requires a manager's approval and could vary depending on IBM's business volume. And the cut in base pay affects benefits such as insurance and disability pay, the workers said.

Alliance@IBM, which is part of Communications Workers of America, represents about 6,000 of IBM's 125,000 U.S. workers. But the union has no bargaining power, because less than 60% of the company's employees are members, said Lee Conrad, a former IBM employee who is Alliance@IBM's national coordinator.

— Patrick Thibodeau

DATA CENTER

Forrester Cuts IT Spending Forecast – Again

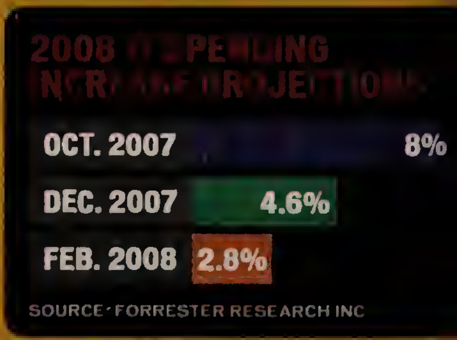
THE DECLINING U.S. economy has moved Forrester Research Inc. to lower its expectations for 2008 U.S. and global IT spending for the second time in less than two months.

In a report released last week, the research firm predicted that U.S. business purchases of IT goods and services will grow by 2.8% this year, down from its December projection of a 4.6% growth rate. The company had initially predicted in October that IT spending would grow by 8% in 2008.

Forrester analyst Andrew Bartels said the latest forecast was issued because of worsening economic indicators in the U.S., European and Asia-Pacific markets.

Globally, Forrester projects an IT spending growth rate of 6%, compared with a 12% growth rate in 2007. "It's a substantial drop in growth, but it's not a decline," Bartels said. "It's a slowdown."

– TODD R. WEISS



2008 IT SPENDING INCREASE PROJECTIONS

SOURCE: FORRESTER RESEARCH INC

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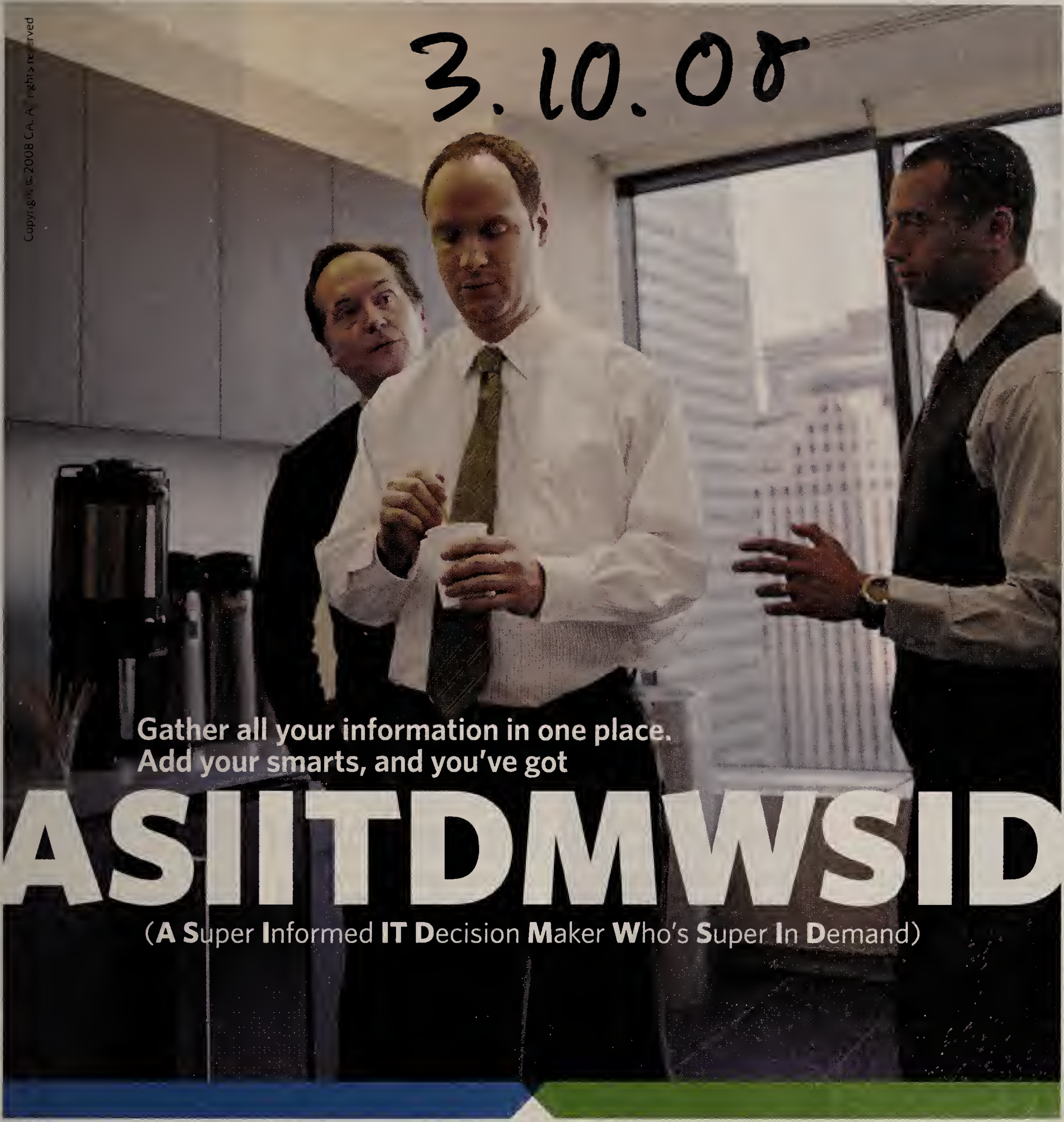
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SOFTWARE SECURITY

Microsoft Issues Most Patches in a Year

MICROSOFT CORP. last week rolled out 11 security updates that patch 17 vulnerabilities in Windows, Office, Internet Explorer, Internet Information Server and other technologies.

The latest monthly update included the most patches issued by Microsoft since February 2007. The company ranked five of the 11 bugs as "critical," the highest rating in its four-level threat-scoring system. The others were pegged as "important," the second-highest rating.

The list did not include an expected update that was scheduled for release but yanked at the last minute: a fix to problems in VBScript and JScript.

Other bulletins addressed problems in Active Directory, the Vista implementation of TCP/IP, the Windows WebDAV authoring and versioning technology, and the OLE automation technology in Windows.

Andrew Storms, director of security operations at nCircle Network Security Inc. in San Francisco, noted that the extensive Microsoft patch list comes on the heels of disclosures of bugs in widely used software from companies like Adobe Systems Inc., Apple Inc. and Skype Ltd. These companies all reported bugs over the past two weeks, Storms noted.

"The volume of the last week is something no security team can staff for," said Storms. "It's almost the worst case possible.

> **The volume of the last week is something no security team can staff for. It's almost the worst case possible.**
>
> **ANDREW STORMS,**
> DIRECTOR OF SECURITY OPERATIONS, NCIRCLE NETWORK SECURITY INC.

"There's so much firefighting going on that it comes down to deciding what risks are the most prevalent, and what can be mitigated without patching or fixing so that people can get to some of the hotter topics," he added.

Don Leatham, director of solutions and strategy at Lumension Security in Scottsdale, Ariz., noted that the latest patches continue a trend in which more critical bugs are being found in client software than in server products.

"The attack surface is moving up the stack into the application and away from the operating system," he said.

"It's interesting that we're still seeing the client side's [vulnerabilities] as more critical than the server side," added Storms. "That's a complete flip from five years ago."

The Microsoft security updates can be downloaded and installed via the Microsoft Update and Windows Update services, as well as through Windows Server Update Services.

— Gregg Keizer

Short Takes

Stephen Norris & Co. Capital Partners LP and partners in the Middle East have agreed to invest up to $100 million in **The SCO Group Inc.** The deal, which needs U.S. Bankruptcy Court approval, would require CEO Darl McBride to "resign immediately."

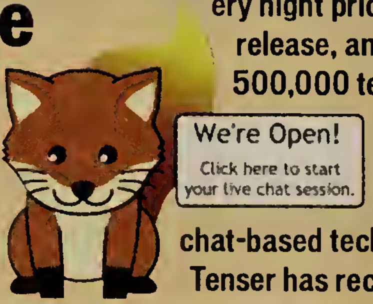
Unilever NV has awarded **Hewlett-Packard Co.** a seven-year, $675 million contract to manage its IT infrastructure in the Americas, Asia, Africa, Turkey and the Middle East. HP will handle IT operations, application development and other tasks.

Silicon Graphics Inc. has acquired **Linux Networx Inc.** for an undisclosed sum. The maker of high-performance clusters had been headed by Robert Ewald before he became CEO of SGI last April.

Door maker **TruStile Doors LLC** and dental lab **Sentage Corp.** have agreed to pay $92,500 and $80,000, respectively, to settle **Business Software Alliance** claims that they ran unlicensed Microsoft Corp. and Symantec Corp. software.

OPEN SOURCE

Mozilla Live Chat Service Faces Early Challenges


We're Open!
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MOZILLA CORP.'S effort to provide live Web support for the Firefox Web browser has started slowly, with the service still in beta, buggy and available to users for only a few hours each day.

Mountain View, Calif.-based Mozilla quietly began the program, staffed by volunteers, at the start of this year. "The hours of operation are currently very conservative," acknowledged Mozilla support manager David Tenser via e-mail.

Firefox has never had trouble attracting volunteers: More than 1,000 people freely contribute code, 20,000 test trial versions of Firefox every night prior to a beta release, and another 500,000 test the betas.

But for the unglamorous job of chat-based technical support, Tenser has recruited only about 20 volunteers, and just three to five of them are available during each three-to-four-hour session.

"What we really need is more exposure so people can both discover how powerful this service is to users, as well as how fun it is to participate," he said.

As of early this month, live-chat volunteers had responded to more than 4,100 requests, or about 100 per day, he said.

Tenser noted that the service does get calls from IT workers, mostly to find out "how to make changes to more than one machine without having to go in via the user interface, or about locking down the preferences so users can't make changes."

– ERIC LAI

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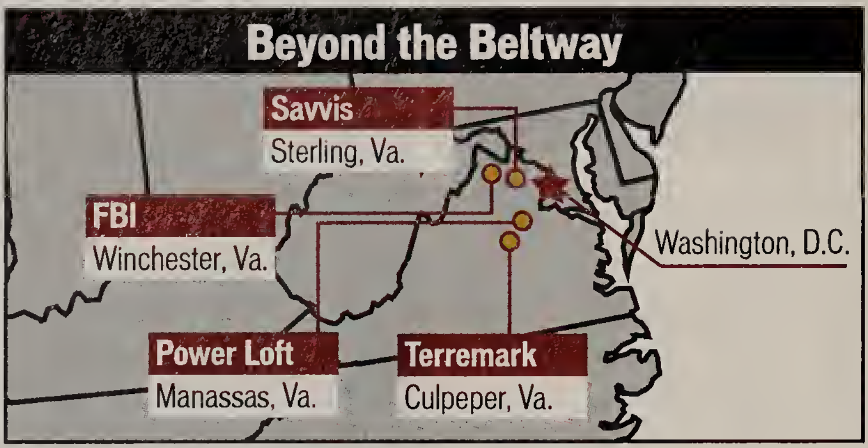

DATA CENTERS

Hosted Data Centers Spring Up Outside D.C.

HOSTING VENDORS are rushing to build data centers in the Washington area, a trend that coincides with an increase in IT outsourcing among federal agencies.

Many of the new IT facilities are being designed with the highest levels of security in mind. For instance, Terremark Worldwide Inc. is building five 50,000-square-foot data centers about 60 miles from Washington in Culpeper County, Va. Terremark has said that the data centers will be able to handle federal data classified as Top Secret/Sensitive Compartmented Information, which is more sensitive than standard top-secret information.

John Slye, an analyst at Input, predicted that spending by federal agencies on application management and services outsourcing — a category that includes data centers — will grow at an average annual rate of 7% over the next five years.

Terremark isn't the only vendor looking to comply with government security standards. In Manassas, Va., Power Loft LLC is building a 200,000-square-foot data center that it says will meet security guidelines specified by the Defense Threat Reduction Agency.

And last fall, Savvis Inc. opened a 30,000-square-foot facility in Sterling, Va., that includes biometric entry systems, bulletproof glass and walls, and a special zone for workers with federal security clearances.

Meanwhile, the FBI is building a 227,000-square-foot data center for its own use in Winchester, Va.

— *Patrick Thibodeau*

BETWEEN THE LINES *By John Klossner*

BENCHMARKS LAST WEEK

A federal judge ordered **Oracle Corp.** and **SAP AG** to use a mediator to try to resolve a lawsuit filed last March by Oracle. The suit claims an SAP subsidiary illegally downloaded data from an Oracle support site.

The **FBI** awarded **Lockheed Martin Corp.** a 10-year, $1 billion contract to develop a biometric identification system that will store palm, iris and facial images.

FOUR YEARS AGO: Yahoo Inc. began using its own software as the default search engine on its U.S. Web sites in place of Google Inc.'s technology.

Global Dispatches

Indian Firm to Run Colo. Call Center

MUMBAI, INDIA – Barclays Bank PLC this month signed a five-year deal calling for Firstsource Solutions Ltd. to run its credit card call center in Colorado Springs.

The deal could be worth up to $80 million (U.S.), according to a notice sent by Firstsource to the Bombay Stock Exchange.

The operations center was opened in 2005 primarily to handle customer service calls for London-based Barclays' U.S. credit card business. The call center handles about 15,000 inbound calls each day and employs about 370 people. It also provides collection and fraud-prevention services, Barclays said.

Firstsource, which is based here, said it also plans to use the facility to serve U.S. customers of other clients.

John Ribeiro,
IDG News Service

Sun to Buy German Virtualization Firm

STUTTGART, GERMANY – Sun Microsystems Inc. last week said it is acquiring desktop virtualization vendor Innotek GmbH as part of an ongoing effort to woo developers to support its own Sun xVM server virtualization program.

Stuttgart-based Innotek is best known for an open-source tool called VirtualBox that Sun said has been downloaded about 4 million times since it was released in January 2007.

Steve Wilson, vice president of Sun's xVM team, said in a blog post that Sun hopes developers writing applications for VirtualBox "can help guide their friends in the data center toward xVM Server as the preferred deployment engine."

Patrick Thibodeau,
Computerworld

BRIEFLY NOTED

Richard Granger has left his post at the U.K. National Health Service's Connecting for Health agency, where he oversaw the deployment of the £12.4 billion ($24.3 billion U.S.) National Programme for IT. The NHS said it plans to reorganize the operation.

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ISTOCK PHOTO

Mainframes Fight to Keep Corporate IT Crown

New IBM systems and a role in SOAs could help keep big iron on the data center throne. **By Patrick Thibodeau**

LATER THIS MONTH, IBM plans to announce a next-generation System z mainframe, its first update of that hardware line since the current z9 models were released three years ago. The company is promising users a 50% boost in processing capacity, plus improvements in energy efficiency, security and system resiliency.

But the new machine won't end the battle for the hearts, minds and IT budgets of mainframe users, who are continually being wooed by vendors — including IBM itself — offering Windows, Unix and Linux servers that are less complex and much less costly.

In last year's fourth quarter, IBM's revenue from the System z line was 15% lower than it was in the same period in 2006. Mark Loughridge, IBM's chief financial officer, said during the company's fourth-quarter earnings conference call last month that, on a MIPS capacity basis, shipments declined 4% in the quarter year to year.

But, Loughridge added, the amount of MIPS shipped on IBM's so-called specialty engines — dedicated mainframe processing units for running Linux, Java, ERP and other workloads — increased 11% in the fourth quarter. And he said that IBM expects to start reaping the benefits of its new mainframe by this year's second quarter.

The mainframe may be venerable, but it still plays a vital role at companies such as Hewitt Associates LLC, a human resources services firm in Lincolnshire, Ill. And that won't change anytime soon, said Mike Walter, a z/VM systems manager at Hewitt.

The mainframe "is the king of the house," he said. "It's where the crown jewels are stored." Hewitt still runs many of its key business applications on a mainframe, and Walter said the company isn't listening to the call of x86-based servers.

One of the biggest reasons for that is the reliability of mainframes, according to Walter. He can recall only one mainframe system crash at Hewitt over the past 10 years. "How many distributed servers can say that?" he asked, noting that the mainframe "doesn't fail."

Power, cooling and floor space are also issues. Walter said there isn't enough room in Hewitt's data center to handle all of the smaller servers that would be needed to replace the virtual systems running inside its mainframe. "Instead of thousands of servers in racks, there's this one box," he said.

That may become even more of an advantage for mainframes once the new System z machine becomes available. Loughridge, who discussed the upcoming announcement during IBM's Q4 earnings call, said the new mainframe will support "unprecedented levels of workload consolidation."

IBM declined to disclose more details about the system, which is expected to be introduced at the mainframe-oriented Share user group's annual conference in Orlando next week.

Many users see upfront costs as a big disadvantage for mainframes. For instance, Palm Beach Community College in Lake Worth, Fla., is replacing a z890 system that it bought for $500,000 three years ago with an Intel-based server that cost about $30,000. CIO Tony Parziale auctioned off the z890 for $40,000 on eBay last month.

Parziale said the IT staff at the

Continued on page 14

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Continued from page 12

46,000-student college will miss some of the tools that are available for managing the mainframe. But the four-socket x86 server "runs faster than the mainframe," he noted, and its software costs also are lower.

Even Share members are far from universal in their commitment to continued use of mainframes. In a survey of Share members last summer, 45% of the 431 respondents said they still store more than half of their data on mainframes. But only 23% said they planned to increase their mainframe usage, while 19% said they would either reduce it or completely move off of the systems. Another 23% said they weren't running any mainframes.

■ Mike Walter, a z/VM systems manager at Hewitt Associates, can recall only one mainframe crash at the human resources services firm over the past 10 years. "How many distributed servers can say that?" he asks.

Since the z9's release in 2005, IBM has made a series of announcements aimed at improving mainframe ease of use. That includes a plan detailed in October 2006 to invest $100 million over five years in an effort to simplify the development and management of mainframe applications and encourage use of the systems in SOAs.

Some of the push for improvements is coming from customers such as Hewitt's Walter. Last year, he posted a message on a mainframe mailing list suggesting the development of a tool that would make it easier to install SUSE Linux Enterprise Server on mainframes. Walter said IBM picked up on his idea and worked with SUSE Linux owner Novell Inc. to create a tool that lets mainframe users install the Linux operating system "quickly and without any experience."

But despite IBM's efforts, mainframes still can be a chore to handle, particularly from a data integration standpoint. About half of the Share members who responded to last summer's survey said they rely on hand-coding by developers to open up mainframe data to other systems. The amount of hand-coding being done indicates that "integration is a hard problem," said Pam Taylor, a Share vice president and an IT architect at a large company that she asked not be identified.

Taylor sees SOA adoption as a means of improving integration. And the survey of Share members points to some movement in that direction. Twenty-three percent of the respondents said they had SOA projects under way, while another 32% said they either were considering an SOA initiative or planned to launch one within six months. On the other hand, less than half of the respondents who have mainframes and are adopting SOAs said that the systems would be used to host or support SOA services.

SOAs will be a major topic at Share's conference next week, said James Michael, the user group's treasurer and an IT manager at a university that he asked not be named. Michael said he wants to explore the idea of sharing code used in SOA development with users in other organizations, in order to help reduce the costs of building the architectures.

Michael thinks the mainframe still has a lower total cost of ownership than other types of servers do when support costs and technical advantages, particularly in virtualization and security, are taken into consideration.

But IBM has to reduce the "sticker shock" of new systems, he said, pointing to the company's specialty engines as one means of doing so. Those devices are tuned for specific workloads and cost less to buy and operate than general-purpose mainframe processors do, according to IBM.

In an attempt to ensure that there are enough IT workers with mainframe skills to meet the demand for them, IBM is funding training programs at universities worldwide. And two years ago, it worked with Share to set up a group called zNextGen for young mainframe workers.

The new group currently has more than 350 members from more than 100 companies in 12 countries, according to Kristine Harper, a programmer at Neon Enterprise Software Inc. who is zNextGen's project manager.

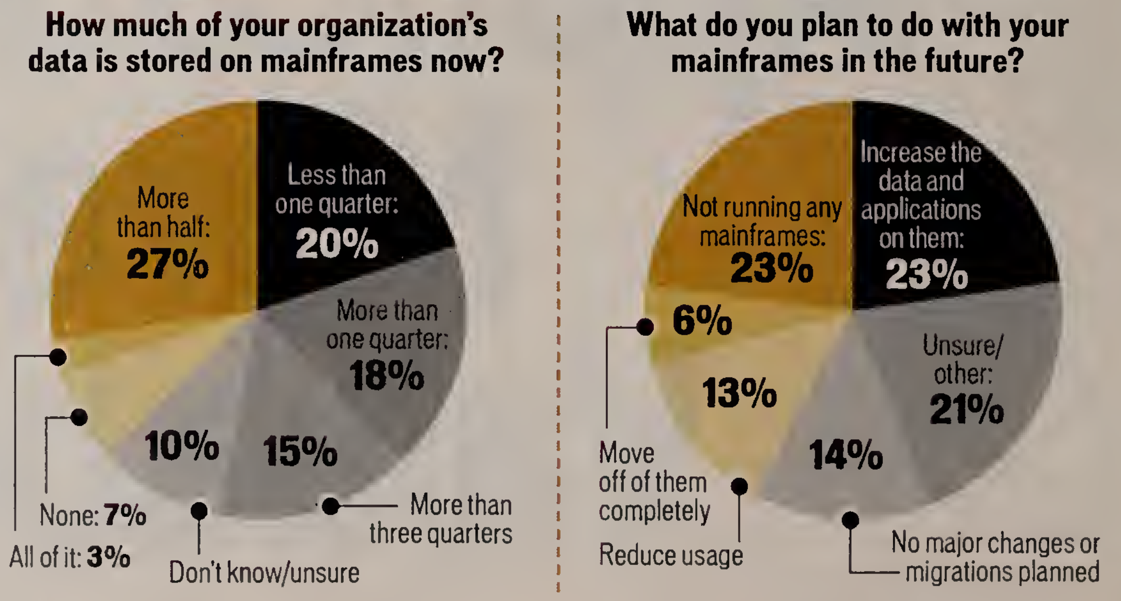
Justin Bastin is a zNextGen member who works as a mainframe programmer at The Sherwin-Williams Co., a Cleveland-based maker of paints and other coating products. Bastin said he likes working on a mainframe because the stakes are so high.

"If you have a problem with the mainframe, it's not as simple as you just reboot," he said. "Once you figure that problem out, it's very rewarding."

Marist College in Poughkeepsie, N.Y., offers a mainframe skills certificate program in conjunction with IBM. Martha McConaghy, an IT manager at Marist, said there is high demand among employers for the students who graduate from the program. "If they can put z/OS on their résumé," she said, "they get hired pretty fast." ■

Chris Kanaracus of the IDG News Service contributed to this story.

THE MAINFRAME: Present and Future



How much of your organization's data is stored on mainframes now?

What do you plan to do with your mainframes in the future?

SOURCE: 431 members of the Share user group surveyed last summer by Unisphere Research, in conjunction with Share

Some things are better left alone.

Before you start that big transition to VoIP, hold the phone. It may not be the grand reconstruction project they've been talking about. Simply stated, it isn't about ripping and replacing or big, upfront costs. That's because it isn't about hardware. It's actually about software. Now you can keep your hardware—your PBX, your gateways, even your phones. Move to VoIP with software. Software that integrates with Active Directory,® Microsoft® Office, Microsoft Exchange Server, and your PBX. Maximize your current PBX investment and make it part of your new software-based VoIP solution from Microsoft. It's big change, without changing it all. Learn more at microsoft.com/voip

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BlackBerry Users Suffer Through Second System Upgrade Snafu

Research In Motion blamed IT problems for an e-mail outage — just like it did last April. The glitches give IT execs some things to think about. **By Matt Hamblen**

LAST WEEK, for the second time in the past 10 months, BlackBerry users were hit by a service outage that vendor Research In Motion Ltd. blamed on an internal system upgrade gone awry.

The latest incident, which delayed the delivery of e-mail for about three hours, prompted some users and analysts to recommend that BlackBerry subscribers carry multiple handheld devices and that IT managers set up notification systems to alert users if messages aren't going through.

It also again raised questions about RIM's network architecture, which routes all of the messages sent by users in North America through a single operations center outside of Toronto.

David Maynor, founder and chief technology officer at Errata Security LLC in Atlanta, said he has started carrying an iPhone in addition to his BlackBerry 8310. For that reason, he was able to continue sending and receiving e-mails during the BlackBerry outage.

Having a backup is worth the added cost, Maynor said. He noted that telling his customers he couldn't respond to messages because the BlackBerry service was down would be an excuse along the lines of a student telling a teacher, "The dog ate my homework."

Maynor asserted that the outage last Monday shows "that RIM is lacking an attention to detail, which can result in serious problems for their customer base."

The e-mail service interruption started at about 3:30 p.m. EST last Monday. In a statement issued the following day, RIM said an initial investigation indicated that the outage stemmed from an upgrade of an internal data-routing system.

The upgrade was part of an effort to increase the capacity of RIM's network. "But there appears to have been a problem with this specific upgrade," the company said without further explanation.

RIM apologized to BlackBerry users for any inconveniences they experienced but said that all messages were eventually delivered.

Last April, the company blamed a half-day service outage on a flawed installation of cache optimization software, followed by a failure of an automated switchover to a backup system. At the time, RIM promised that it would bolster some of its testing, monitoring and recovery processes in an effort to prevent repeat episodes.

John Halamka, CIO at CareGroup Healthcare System and Harvard Medical School in Boston, said the outage affected hundreds of users in the two medical organizations. RIM notified him about the outage via e-mail about an hour after it began, Halamka said.

> **We do depend on BlackBerry services for many mission-critical functions, so I hope there were lessons learned to prevent future outages.**
>
> JOHN HALAMKA, CIO, CAREGROUP HEALTHCARE SYSTEM AND HARVARD MEDICAL SCHOOL

Because the outage occurred near the end of the workday on the East Coast, users at CareGroup and the medical school "were not vocal" about it, Halamka said. But, he added, "we do depend on BlackBerry services for many mission-critical functions, so I hope there were lessons learned to prevent future outages."

Asked whether he might look at alternative services, considering this was the second BlackBerry outage in less than a year, Halamk was sympathetic to RIM. "I suspect this outage will be the catalyst that results in more redundancy, leading t fewer [and] shorter outages in the future," he said.

Gartner Inc. analyst Phillip Redman said that for RIM, it's "critical to keep the highest service levels" possible. Continued outage "will push users toward oth er options that don't have a single point of failure," Red man said, referring to RIM' reliance on its network operations center in Canada a a conduit for all messages.

Ken Dulaney, another Gartner analyst, said companies that use BlackBerrie or any other wireless e-mai system to send important messages should set up problem-notification systems through their wireless carriers. That way, users would be automatically alerted if the messages they sent weren't being delivere

"We believe that any mission-critical application for BlackBerry should be supplemented with a notification system," Dulaney said. Not doing so, he adde is "foolhardy." ■

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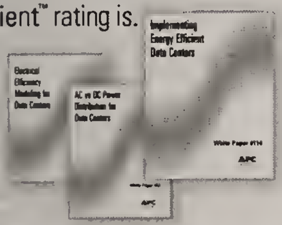

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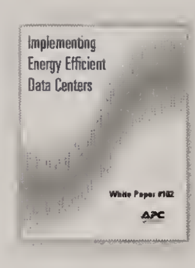

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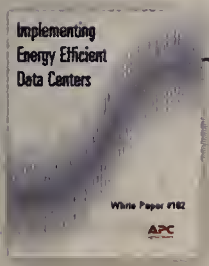
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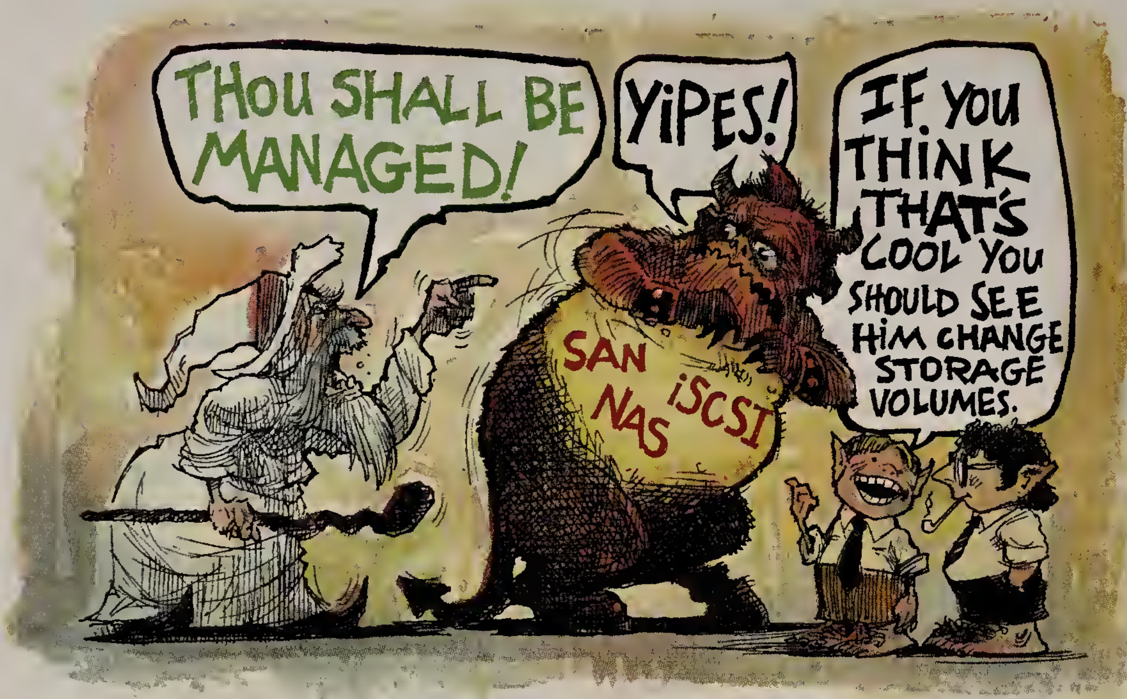
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A Wiz at Storage Admin

NOBODY EVER said that managing big storage systems is a walk in the park. But to hear Dave Hubbard, you'd think storage administrators were slaying dragons. The CEO of Reldata Inc. in Parsippany, N.J., says that besides the fact that there are myriad admin tasks — SAN management, NAS troubleshooting, virtualizing storage, data replication over WANs — each storage vendor has different techniques for accomplishing them.

You practically have to be a wizard to do them all right. Which is why Reldata is including Adaptive Storage Wizards as part of the release later this month of RelVOS 2.2, the company's storage virtualization tool. Hubbard claims that RelVOS lets you set up a single pool of all your iSCSI, NAS and SAN systems. He says you can expand that pool from terabytes to petabytes, "growing it disk by disk" as necessary. It also runs over 10Gbit/sec. Ethernet for blazing speed.

22%
Median annual growth rate of storage inside data centers, per Nemertes Research Group Inc.

Hubbard says the wizards are intended to help administrators with their day-to-day work by walking them through tasks such as changing storage volumes. The result: Admins do things faster and make fewer mistakes. "You still have to be knowledgeable, but you don't have to be an expert," Hubbard says. Pricing starts around $35,000.

U.S. Data Centers Managed From India?

Talk of recession is once again putting cost-cutting uppermost on IT executives' minds. That's good news for managed service providers. But Sandip Gupta says he can go one better than North American MSPs in cutting IT operations costs. Gupta is president of India-based NetMagic Solutions Pvt., which last week said it plans to expand its MSP offerings to the U.S., providing remote infrastructure management from its network operations center in Mumbai. It has picked up $20 million in venture backing to accomplish just that. NetMagic will offer three levels of service: basic monitoring, alert response and in-depth management, including patching and change control. Gupta contends that many U.S.-based MSPs are former value-added resellers that are comfortable managing PCs but out of their depth in the data center. And, he says, "we'll deliver the same service-level agreement at a much lower price point than an MSP here."

Gupta: It's time to manage U.S. data centers from India.

Citrix XenServer Goes Platinum

Last year, Gartner Inc. put the amount of data center servers that have been virtualized at 6%, with the number growing to 14% in 2010. That means there's a lot of virtualization gold remaining to be mined in global data centers. In the case of Citrix Systems Inc., make that platinum. The Fort Lauderdale, Fla.-based company says its rollout of XenServer 4.1 in March will be followed by the arrival of XenServer Platinum in April. What makes the Platinum edition special, claims Phil Montgomery, senior director of product marketing, is that it "links together the physical and virtual infrastructure." With it, he says, you can provision an unlimited number of virtual servers, as well as move workloads from virtual to separate physical systems. He says developers might want to use it to write and debug code in a virtual environment, then roll it out for full-blown testing on a different server. According to Montgomery, XenServer 4.1 is the first release of the virtualization tool since Citrix bought XenSource last year. He says the company has tied it more tightly to the Citrix Presentation Server, whose name is being changed to XenApp. Pricing for XenServer Platinum starts at $5,000. ■

94%
Data center servers that were not virtualized last year, says Gartner.

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KATHERINE LAMBERT

THE GRILL

Marc Rotenberg

The **privacy advocate** talks about the dangers in the **Google-DoubleClick merger**, **Homeland Security's use of RFID** and new notions of online privacy in the age of **Facebook**.

Dossier

Name: Marc Rotenberg

Title: President

Organization: Electronic Privacy Information Center

Location: Washington

Little-known facts: He's a tournament chess player who won the 2007 Washington chess championship.

Also, his experience with computers goes back to using a Hazeltine Terminal to teach a computer science course at Harvard University in the 1970s.

A good book he read recently: *Whispering Wires* by Philip Metcalfe, about a famous wire-tap case in the 1920s.

Technology pet peeve: "I hate complicated interfaces."

Epitaph of choice: "Privacy is worth fighting for."

In December, the Federal Trade Commission voted to allow Google Inc. to proceed with its planned $3.1 billion acquisition of online ad-serving vendor DoubleClick Inc. The Electronic Privacy Information Center's Marc Rotenberg says no recent privacy campaign has been more significant than the effort to block the Google deal — although he and other privacy advocates are voicing similar concerns about Microsoft Corp.'s $44.6 billion offer for Yahoo Inc.

What red flags does the planned Google-DoubleClick merger raise? I don't think there is any doubt that this is the single biggest privacy meltdown that the Internet is currently facing. The FTC should either block that deal or impose a privacy condition as a substantial requirement of the merger being approved.

Can you illustrate the privacy problems raised by the Google-DoubleClick merger? Google has been very quiet about what it plans to do with DoubleClick. For example, do they plan to combine [search engine data with] the data that DoubleClick currently has on Internet users who surf the Web?

> **“I don’t think there is any doubt that [the Google-DoubleClick merger] is the single biggest privacy meltdown that the Internet is currently facing.**

If it is Google’s intent to get access to that data, they will have the deepest and broadest profile of Internet users of any company in the world. And they are also under virtually no legal obligation to limit how they might use that data. Tomorrow, perhaps they decide to do insurance evaluation or risk management or border screening for the Department of Homeland Security. There are lots and lots of different ways that that data could be used.

What kind of profile could they assemble on Web users? Most people tend to focus on the Big Brother data-collection side, and that’s simply taking information about a person from different aspects of their private life: their medical records, their financial records, where they go online, what they put in e-mail, who they call. But the second part, which in many respects is becoming more important, is the algorithm that is put on top of that data and the decisions that are made [after analyzing the data]. That’s actually an area that EPIC is spending a lot more time on these days.

Why? Because if you look at such questions as which banner ads an Internet user sees when they visit a Web site, or whether an airline passenger is pulled aside for secondary screening, what is really happening is a type of profiling that involves not only the data collection, but also some decision-making process that treats one person very differently from another person. That’s also something that turns out to be secretive.

Could these profiles be used to tell a company whether someone is a good candidate for insurance or health care coverage? I think that is a very obvious business opportunity for Google. And in some respects, it’s even more attractive to Google than it is to companies that are currently in the business of managing medical records — because under the HIPAA privacy rule, Google would not be subject to the privacy obligations that traditional health institutions are subject to, which means that Google is, in effect, in the best position imaginable to exploit the data that it collects.

If I use Google to search for info about a medical condition, could that come back to haunt me? Let’s say the search phrase you use is “Ritalin and side effects” because you’re trying to understand what the consequences might be for a child using Ritalin. Now that, for an insurer, is a red flag. And there are really no legal restrictions on what Google does with that information. So here is this company in possession of personal information about millions of Internet users, and in certain contexts, it could clearly be stigmatizing.

Some argue that the younger generation – the Facebook and MySpace users – are less guarded about privacy. Are they the vanguard of a new way of thinking about privacy, or are they naive? Younger people today have a different way of thinking about privacy. But I think the mistake that sometimes people make is to believe that because kids have a different expectation of privacy, somehow it’s a diminished expectation.

Are they sharing more information about themselves in public environments than they should be? I think the interesting issue is when the information that they make available to their friends — for example, on a social network site — is gathered surreptitiously and used for marketing purposes. There really is a [valid] debate about whether people, and kids in particular, understand what’s going on and if it’s really fair.

I was at an IBM conference recently where the badges included RFID tags to automatically track which sessions you walked into. The organizers had a reasonable explanation: Instead of scanning people’s badges, they just RFID’d them. But what happens when driver’s licenses and library cards get RFID tags? The analogy is imperfect. When you scan a card, the person is aware that the card is being read. The problem with an RFID tag is that it can be read at any time by anyone who is in possession of a reader — whether or not the person knows that their card is being scanned.

How do you think the DHS is going to use RFID tags? We know that they are adopting a standard that a lot of people are not very happy about. It’s the so-called vicinity-read or contactless-read RFID tag. It’s designed precisely to prevent people [from knowing] when the data on the tag is being read. That violates a central principal of [personal] security, and that is basic access control: You want people to know when information about them is being requested by others, if for no other reason than to be able to make sure that it’s being requested for an appropriate purpose.

— *Interview by* **Patrick Thibodeau**

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Tapping Business Intelligence Now

There's a lot of data out there, but using it wisely is a challenge.

Business intelligence (BI) doesn't have to be a pie-in-the-sky, big-bang, strategic project that takes years to perfect before it generates a return. For those who get it right, the benefits can be as close as your nearest cash register, as immediate as your next purchase order and as dramatic as capturing thousands of dollars in lost revenue.

Getting results requires an understanding of what really drives profit and loss in your business, a willingness to keep learning about and training your users in business intelligence, and the ability to move quickly and to question conventional wisdom.

For those who do BI right, the results go beyond short-term improvements in efficiency and profits to long-term cost savings and strategic changes that boost earnings.

That's not to say that implementing BI is simple or easy for every organization. It's all too easy to get tripped up by technical, training or cultural issues. One challenge is the seemingly straightforward process of agreeing on common terms. Another is misinterpretation of data if managers focus only on numbers and ignore business processes.

Ideally, BI changes the corporate culture so that every manager is responsible for his own budget, every sales agent knows what he needs to do to improve his performance, and every employee knows how the company is doing on an almost-constant basis.

……………………

➤ **This Executive Briefing looks at the theory and practice of data-driven decision-making. We talk with experts and examine successful implementations of information management technologies. www.idgtechguides.com/cwprint**

COMPUTERWORLD
EXECUTIVE BRIEFINGS
EXECUTIVE GUIDES FOR STRATEGIC DECISION-MAKING
Tapping Business Intelligence Now

Corporate BI Use
BI in place - not looking to add to it
No BI - not looking for a product
Large Companies (1,000+ employees)
40%
QuickPoll
The biggest business intelligence problem in my

Optimizing IT

Getting to Green

For many companies, using electricity is either a matter of saving money or saving the environment. But for some, it's a necessity. They simply can't get enough power to heat or cool their IT infrastructures at any price. What to do?

Storage strategies such as information life-cycle management and data de-duplication can reduce energy needs. Sever consolidation and virtualization allow IT to manage — and power — fewer machines. Using power management utilities, already available on almost every server, can cut data center energy requirements significantly.

Some organizations are looking to technologies such as solar panels to provide power. But this can be a tough sell because solar power can require a six- to eight-year payback period, far longer than the two- to three-year return on investment many companies require. Still other users are looking to reduce their power needs by changing the design of the buildings that house their data centers.

Meanwhile, other organizations are looking beyond energy consumption to make their operations green. They're considering how IT equipment will be disposed of and developing ways to reuse and recycle old gear without releasing toxins into the environment.

Whatever the approach an organization takes or the amount of effort it puts into going green, any environmental initiative must also produce a business benefit — usually in the form of lower costs — to become an ongoing part of the company's strategy and corporate culture.

……

➤ In this Executive Briefing, we provide tips and tricks to help reduce power consumption, waste and chaos. www.idgtechguides.com/cwprint

COMPUTERWORLD

EXECUTIVE BRIEFINGS

Getting to Green

QuickPoll

The best way to "green" a data center is to:

60.0%

Seven Steps Toward Going Green

STRATEGY	HOW TO DO IT	BENEFIT	COMMENTS
Consolidate	Find and turn off unused	Lower costs to buy.	

Power in Numbers

Are energy costs becoming a bigger part of your overall total cost of ownership for IT equipment?

■ Costs have risen somewhat

Governance & Risk Management

Making Business Sense of IT

Align IT and business. Use assets and people effectively. Reduce risk. Run a transparent IT operation. Those are the goals. The name is IT governance.

When implemented correctly, IT governance keeps IT organizations focused on the right projects. It makes them more efficient at executing those projects, and it forces better tracking of assets and resources.

IT governance should mean that a company has brought business know-how into its IT group. A company that has successfully implemented an IT governance program will no longer have an IT shop that operates as if it is on its own island.

The goal of IT-business alignment is to help the organization reach its goals by improving the outcomes of IT initiatives. A poorly aligned IT organization is one that's unable to respond to ever-changing business needs.

Project management is just one of several IT management fields that come together under the broad umbrella of IT management. Today, it also includes change management, application life-cycle management, asset and resource management, portfolio management and, often, security management.

COMPUTERWORLD

EXECUTIVE BRIEFINGS

Making Business Sense of IT

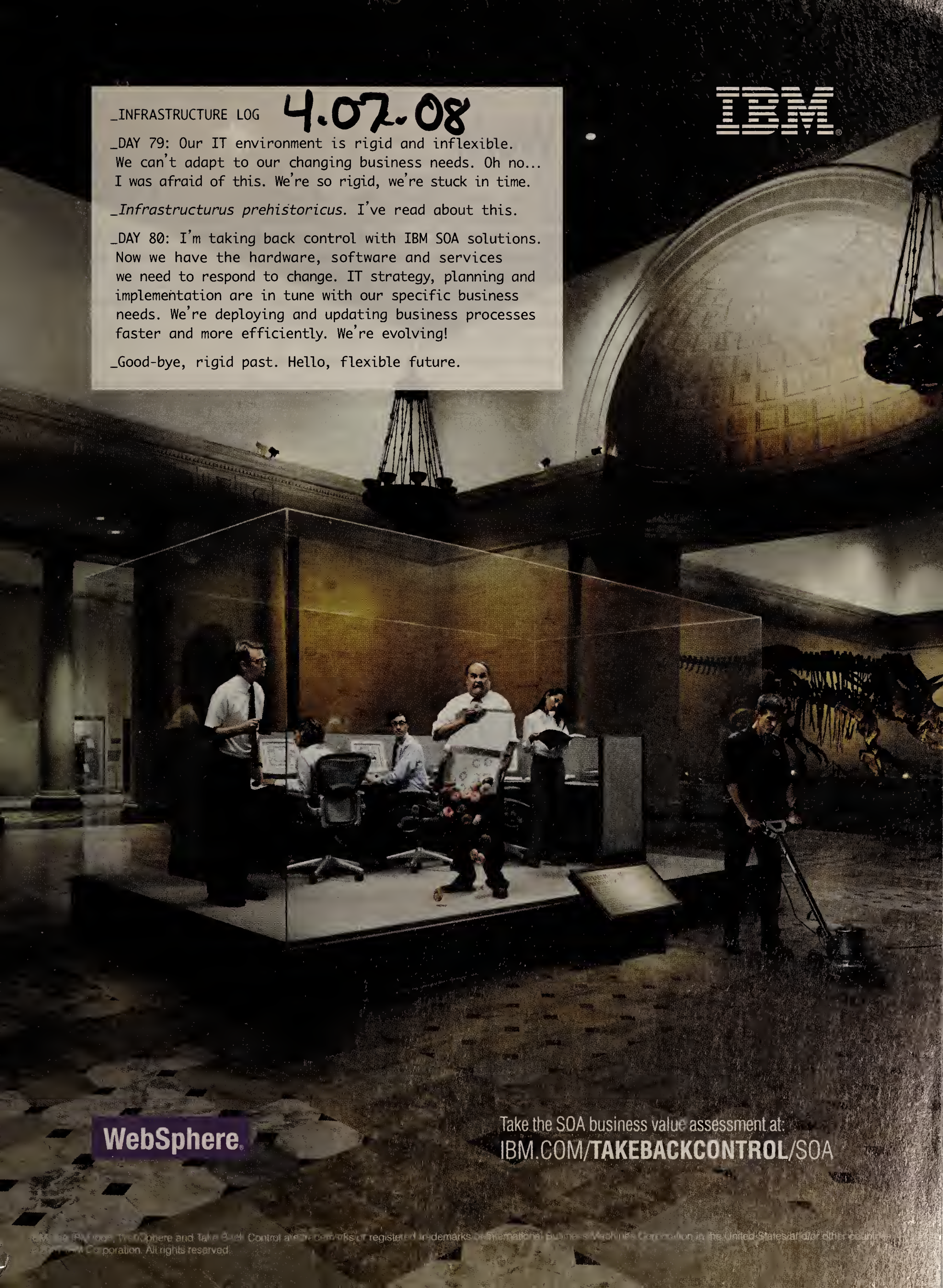
Technology may make business processes efficient, but business is giving IT its purpose

What Makes a Turnaround CIO?

COMPANIES WANT TO HAVE THEIR CAKE AND EAT IT TOO,

……

➤ This Executive Briefing discusses many of the nuts-and-bolts issues relating to aligning business and IT goals. From keeping major IT projects on track to disaster recovery and from turnaround CIOs to metrics and employee development, real-world examples illustrate the best management practices. www.idgtechguides.com/cwprint



_INFRASTRUCTURE LOG 4.07.08

_DAY 79: Our IT environment is rigid and inflexible. We can't adapt to our changing business needs. Oh no... I was afraid of this. We're so rigid, we're stuck in time.

_*Infrastructurus prehistoricus*. I've read about this.

_DAY 80: I'm taking back control with IBM SOA solutions. Now we have the hardware, software and services we need to respond to change. IT strategy, planning and implementation are in tune with our specific business needs. We're deploying and updating business processes faster and more efficiently. We're evolving!

_Good-bye, rigid past. Hello, flexible future.

IBM

WebSphere.

Take the SOA business value assessment at:
IBM.COM/**TAKEBACKCONTROL**/SOA

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Empowering People

Teaming Up for Work

Users are becoming better acquainted with the benefits of collaboration tools in their personal lives and are eager to put them to use in the workplace. This enthusiasm, if channeled correctly, can lead to great benefits for organizations.

Today, many companies think of collaboration in terms of their legacy applications that allow users to share calendars, edit documents via whiteboards and tap into one another's e-mail folders. Newer offerings take collaboration up a notch, allowing users to share opinions, co-create project-based Web-sites, aggregate feedback and build profiles based on expertise.

Tools such as instant messaging, social computing, blogs and wikis can kick group projects into high gear among enterprise users. They provide increased productivity and knowledge-sharing for real-time collaboration.

Without guidance from IT, these tools can also pose a significant threat to organizations. The real win will come when IT teams play a role in the selection, deployment and management of collaboration platforms.

The reason is simple: In an era of privacy concerns and compliance restrictions, collaboration efforts must be protected by network security and policy. The more IT is involved in managing these new tools, the less likely it is that security breaches will occur.

Fessing Up About Web 2.0

Does your company ban engaging in Web 2.0 activities, such as blogging or visiting Web 2.0 sites such as YouTube during work hours?

Yes 76%

No 22%

Don't know/not sure 2%

COMPUTERWORLD

EXECUTIVE BRIEFINGS

Teaming Up for Work

QuickPoll

What do you think of collaboration tools for your team projects?

➤ New technologies have revolutionized the way enterprise teams work. This Executive Briefing explains how to get the most out of your workforce using collaboration software, messaging suites, Web 2.0 and other software tools. www.idgtechguides.com/cwprint

Enabling Business Flexibility

Managing for Agility

When a national retail giant tailors the product mix and even the look and feel of individual stores to the needs of neighborhood customers, that's agility. When nontechnical users can deploy and tweak product promotions on the corporate Web site without help from IT, that's agility. When a consumer goods manufacturer changes product design on the fly as it gets feedback from customers, that's agility.

For a large, complex organization, agility means more than merely responding quickly to change. It requires quickly and accurately detecting changes in the business environment, creating appropriate responses to those changes, communicating and implementing the new strategies across the organization, and then monitoring and modifying those strategies as needed over time.

Becoming agile requires changes in culture and business processes. Executive sponsorship is critical to force sometimes competing business units to work together and to share information in ways they normally wouldn't. Agile software-development methodologies require business managers to commit more time and effort to software development than they might normally.

Agile IT operations can deliver products and services promptly, and they can update and improve and reconfigure those resources as need be. But only good management practices will keep it all working together.

Going agile a challenge. But it's not impossible.

➤ Today's corporations need to bend without breaking. In this Executive Briefing, we look at best practices for providing and managing IT in an on-demand world. www.idgtechguides.com/cwprint

COMPUTERWORLD

EXECUTIVE BRIEFINGS

Managing for Agility

Agility is...

QuickPoll

_INFRASTRUCTURE LOG

_DAY 82: There are so many risks out there. Traffic spikes, natural disasters, mergers. How do we prepare? One in three companies don't recover from unplanned downtime.[1] Would we?

_Gil wrapped everything with bubble wrap. Just to be safe.

_DAY 83: I'm preparing with IBM Business Resilience Solutions. IBM Business Continuity Services help us assess our risks and design a proactive plan to deal with them. IBM Tivoli gives us the visibility to diagnose and fix infrastructure problems. And the robust availability features of the IBM System p™ give us maximum uptime.

_No more bubble wrap. And I have to mail a package. Great.

IBM®

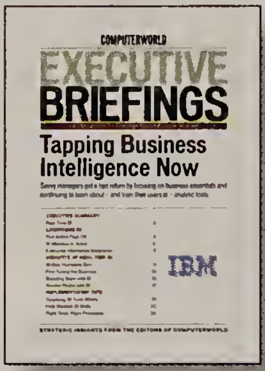
Tivoli.

Take the business continuity assessment at:
IBM.COM/**TAKEBACKCONTROL**/READY

[1] Source: "Business Continuity Unwrapped," Continuity Central, 2006, www.continuitycentral.com/feature0358.htm. IBM, the IBM logo, System p, Take Back Control and Tivoli are trademarks or registered trademarks of International Business Machines Corporation in the United States and/or other countries. ©2007 IBM Corporation. All rights reserved.

WHAT YOU'LL FIND INSIDE

www.idgtechguides.com/cwprint



COMPUTERWORLD
EXECUTIVE BRIEFINGS
Tapping Business Intelligence Now
IBM

Tapping Business Intelligence Now

Executive Summary
- Real-Time BI

Launching BI
- Fast Action Pays Off
- BI Mistakes to Avoid
- Enterprise Information Integration

Benefits of Real-Time BI
- BI One; Hurricane Zero
- Fine-Tuning the Business
- Boosting Sales with BI
- Retailer Rocks with BI

Implementation Tips
- Deploying BI Tools Wisely
- Help Wanted: BI Skills
- Right Tools, Right Processes
- BI Resources from IBM

COMPUTERWORLD
EXECUTIVE BRIEFINGS
Getting to Green
Managers should look beyond power use to reduce IT's overall environmental impact.
IBM

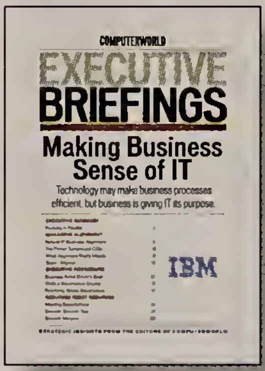
Getting to Green

Executive Summary
- Doing More to Go Green

Going Green Slowly
- Customers Slow to Change
- Feds Push Energy Savings
- Forced to Go Green

Getting Up to Speed
- Cutting Storage Power Costs
- Seven Green Computing Strategies
- Building Green Data Centers
- Easy Steps to Cutting Power

The Next Green Frontier
- Wanted: New Technologies
- IT Clears the Road
- Tools and Resources from IBM



COMPUTERWORLD
EXECUTIVE BRIEFINGS
Making Business Sense of IT
Technology may make business processes efficient, but business is giving IT its purpose.
IBM

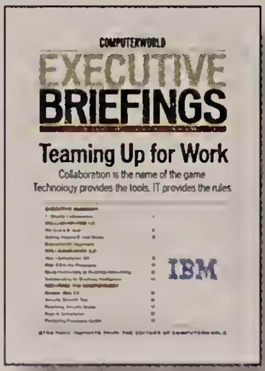
Making Business Sense of IT

Executive Summary
- Running In Parallel

Managing Alignment
- Natural IT-Business Alignment
- The Fixers: Turnaround CIOs
- What Alignment Really Means
- Stayin' Aligned

Standard Procedure
- Business in the Driver's Seat
- Chart a Governance Course
- Balancing Global Governance

Reducing Risky Behavior
- Meeting Expectations
- Disaster Survival Tips
- Smooth Mergers
- Governance Resources from IBM



COMPUTERWORLD
EXECUTIVE BRIEFINGS
Teaming Up for Work
Collaboration is the name of the game. Technology provides the tools, IT provides the rules.
IBM

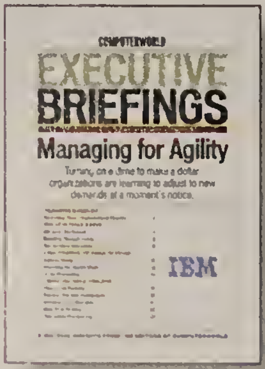
Teaming Up for Work

Executive Summary
- IT: Driving Collaboration

Collaboration 1.0
- The End of E-mail
- Getting Beyond E-mail Woes
- Enterprise IM Strategies

Collaboration 2.0
- Web Collaboration 101
- Web 2.0 in the Workplace
- Social Networking as Business Networking
- Collaborating for Business Intelligence

Securing the Environment
- Beware: Web 2.0
- Security Survival Tips
- Resolving Security Issues
- Keys to Compliance
- Protecting Corporate Assets
- Collaboration Resources from IBM



COMPUTERWORLD
EXECUTIVE BRIEFINGS
Managing for Agility
IBM

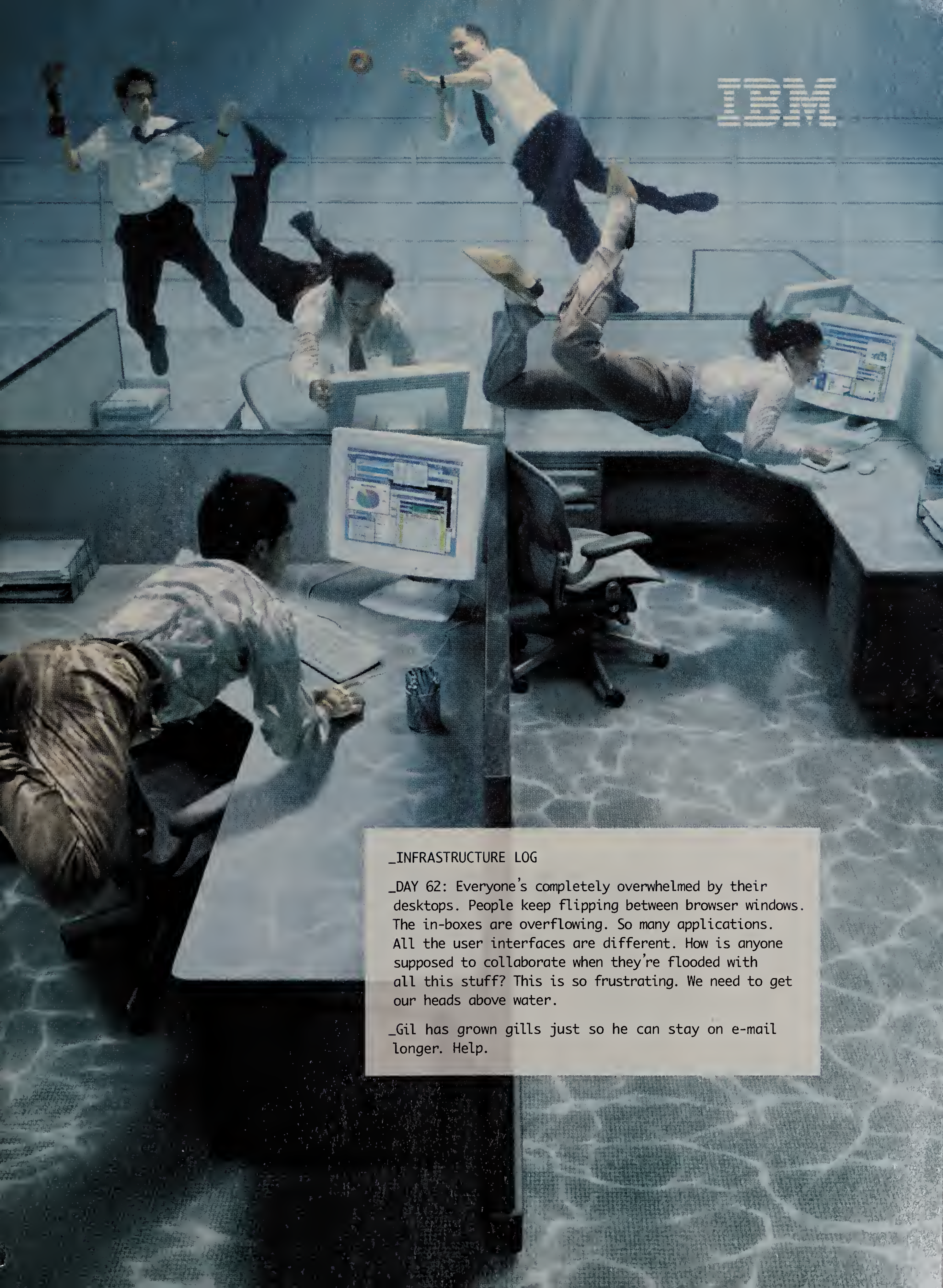
Managing for Agility

Executive Summary
- Stretching Those Organizational Muscles

The View from Above
- Be Quick, Be Robust
- Breaking Through Inertia
- Toward More Innovative IT

Firm Control of Agile Systems
- Agile by Design
- Informing the Supply Chain
- Hasty Processing

Using the Agle Toolbox
- Flexing Old Systems
- Service-Oriented Architecture
- Vendors on On-Demand
- Real-Time Sharing
- Thin-Client Provisioning
- Tools and Resources from IBM for Managing an Agile Business



_INFRASTRUCTURE LOG

_DAY 62: Everyone's completely overwhelmed by their desktops. People keep flipping between browser windows. The in-boxes are overflowing. So many applications. All the user interfaces are different. How is anyone supposed to collaborate when they're flooded with all this stuff? This is so frustrating. We need to get our heads above water.

_Gil has grown gills just so he can stay on e-mail longer. Help.

Take back control of the desktops with IBM Lotus® Notes® and Lotus® Domino® 8.

Control end-user productivity *by putting the applications and tools everyone uses all in one place. An intuitive, Web-like interface means users can work more efficiently and with minimal IT support.*

Control your environment *by easily creating Web 2.0-based composite applications. Your co-workers now have a role-based work space so they can quickly adapt to their changing business needs.*

Control and enhance communications *with integrated e-mail, instant messaging, calendaring, and contact management tools that make collaboration faster and more effective.*

Control your time *with powerful desktop management tools. Now you can centrally manage deployment and upgrades. Open standards give you a flexible platform to easily develop new plug-ins.*

Control your investments *by working with your existing assets and platforms. Backward and forward compatibility means less time and money spent on new apps and on training co-workers to use them.*

Control your overflowing desktops *with IBM Lotus Notes and Domino 8 software, the new standard in desktop and collaboration environments.*

Watch the IBM Lotus Notes & Domino 8 Webcast at:
IBM.COM/**TAKEBACKCONTROL**/LOTUS8

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ISTOCKPHOTO

COMPUTERWORLD'S

TOP 12 GREEN-IT COMPANIES

IT is keen on green. And with its power-sucking data centers and streams of churned-out, burned-out equipment heading to landfills, there's plenty to be done.

Green computing promises an enormous win for IT: a chance to save money — and the environment. *Computerworld* identified 12 companies that are implementing smart, efficient strategies to achieve "green IT." They're virtualizing, videoconferencing, turning down cooling systems and turning off the lights. You can, too. Turn the page to meet our "Green Dozen" — the organizations that best exemplify what it means to be green. »»

How We Determined The Top 12

COMPUTERWORLD'S TOP 12 GREEN-IT COMPANIES This fall, *Computerworld* set out to identify companies that are implementing smart, efficient strategies to achieve "green IT." We contacted select green-IT experts for help in developing a set of criteria to identify the companies that are working to reduce energy consumption in their IT equipment and are using technology to conserve energy and lower carbon emissions. These experts included members of The Green Grid consortium, Forrester Research Inc.'s Christopher Mines and Base Partners Inc.'s Aaron Wangenheim.

Based on this input, a group of *Computerworld* editors developed a checklist-style survey and weighting scheme. The survey was sent out to the IT community through a variety of channels, including e-mail newsletters, *Computerworld.com* and e-mail broadcasts. Surveys were collected in November 2007. To view the full survey, visit *www.computerworld.com/topgreen*.

We received 86 completed surveys. *Computerworld* then contacted representatives at those companies who are at the vice president level or higher to verify that the information provided was truthful and accurate. Only those companies that filed verification letters were considered. We then split out companies that are IT vendors and data center suppliers, creating a separate vendor list (see page 36).

Based on the weighting scheme developed, the Top 12 Green-IT Users and Top 12 Green-IT Vendors lists were chosen. They are presented here in ranked order. ■

CHRIS HARTLOVE

Highmark's Tom Tabor (left) and Mark Wood say the medical insurer's new green data center is only the beginning: Using energy-conserving technologies, they're working to cut power usage companywide

Highmark Inc.

1

Harrisburg, Pa.
www.highmark.com

What's special: Pushes cold air under a raised floor in the data center to cool server racks, which are equipped with monitors to regulate fans, based on the amount of heat generated.

What's cheap: Collects rain runoff from the roof to cool equipment.

BY JULIA KING

HIGHMARK INC. spent about $45,000 each month on electricity in its old data center, a 24,000-square-foot, Tier 1 facility in Camp Hill, Pa.

The company's new data center, built entirely of recycled building materials and certified as a leader in energy and environmental design by the U.S. Green Building Council, is an 86,000-square-foot, Tier 3 facility with some 28,000 feet of raised flooring. The new data center is three times bigger than the old one, but its electricity costs are the same: $45,000 per month.

Thanks to an array of energy-conserving technologies — including server virtualization and next-generation air- and equipment-cooling processes — the medical insurer has not only kept its energy costs in check, but has also expanded operations and increased production since building the data center in 2005.

Now the goal is to decrease power usage companywide. For IT specifically, the target reduction is 5% this year. Currently, the company's main data center in Harrisburg uses about 700 kilowatts of electricity per month — enough to power 175 homes, says Mark Wood, director of data center infrastructure.

Highmark will pay 6.5 cents per kilowatt until 2010, when rate caps come off. But after that, "we're expecting a 20% to 30% increase in energy costs," says Wood. "Anything we can do now to reduce consumption will lower that."

Continued on page 32

>THIS IS THE LATEST STRAIN OF SPAM
>THE ONLY WAY TO STOP IT
IS TO BE ONE STEP AHEAD OF IT

>WE ARE MESSAGELABS
>WE ARE THE PEOPLE WHO
DESTROY THIS STUFF

>SPAM NOW ACCOUNTS FOR 80% OF ALL EMAILS
>IT'S GETTING MORE & MORE SOPHISTICATED
>WE GIVE YOU A 99% GUARANTEE AGAINST SPAM
>VISIT MESSAGELABS.COM/THREATS FOR
A FREE TRIAL

MessageLabs | Be certain

IMAGE GENERATED USING SOURCE CODE FROM SPAM RUSSIAN3

Continued from page 30

Highmark began virtualizing servers last year, replacing about 100 of them with virtualized machines. IT also has migrated its Lotus Notes mail system from servers to an existing mainframe, using previously unused mainframe capacity to support e-mail at the 12,000-person company. IT will keep working on server virtualization this year, Wood says, but that's only a start. “Now we need to look at disk virtualization, and we need to go to de-duplication of data to save [disk storage] space,” he adds.

Highmark has taken a unique approach to the challenge of cooling equipment in the data center, where it recirculates the air to keep temperatures down. “The air handlers on the floor push cold air under the raised floor. We then pull that air through the front door of our 19-inch [server] racks as part of our cooling system,” Wood says. “We have monitors inside each rack that speed up or slow down fans based on the amount of heat it generates.”

Another unique energy-conserving feature is a 100,000-gallon water tank underneath the data center. Highmark uses the tank to collect rainwater that runs off the roof and then uses the water to cool the data center, which evaporates water at a rate of about 12 gallons a day. “Everybody always thinks about energy, but water is just as valuable, because without water, you can't cool equipment,” Wood notes.

Forrester Research Inc. analyst Christopher Mines says Highmark is “ahead of the pack in even looking at this dimension of the [cooling] problem. Virtually every company I talk to is focused on electricity usage” and maybe the resulting carbon emissions, he adds.

Highmark CIO Tom Tabor partially attributes Highmark's leadership status on the green-IT front to good timing. “We've had an opportunity to provide leadership as a result of building the data center at the right time,” he says.

It's also fitting for IT to be the leader within the company. “The data center consumes more power than anywhere else in the organization,” Tabor says. “Highmark is an organization that runs on information, and our data center is the guts of the organization.” ■

Discovery Communications LLC

BY ROBERT L. MITCHELL

2

Silver Spring, Md.
www.discovery.com

[illegible] Conducts equipment audits to ensure full utilization; consolidated storage into a single shared pool; and reduced its server count from 850 to 535 physical machines.

[illegible] Raised temperature set points a few degrees in its data centers.

FOR DISCOVERY Communications LLC, energy efficiency in IT isn't just about saving money — it's about keeping up with a brand that's focused on saving the planet. The entertainment company, known for its cable TV networks Discovery Channel, TLC and Animal Planet, among others, recently received a Leadership in Energy and Environmental Design (LEED) certification for its Silver Springs, Md., headquarters.

IT is following that lead. “We're trying to figure out how you build out a tech center to be green-compliant and take advantage of that,” says CIO Dave Kline.

Despite the hoopla around all things green these days, Discovery's top-down approach is ahead of the curve. A recent Forrester Research Inc. survey found that just 15% of U.S. companies have green-IT plans, although another 40% say they're working toward that. “It's a small slice of the corporate world so far,” says analyst Christopher Mines.

Kline's IT organization is off to a good start. The company conducts regular audits of its server, storage and network equipment to make sure everything is fully utilized. It has consolidated storage into a single shared pool using Network Appliance Inc.'s FlexVol technology, and it used VMware Inc.'s virtualization software to reduce its server count from 850 to 535 physical machines. Disk-to-disk backups have replaced backup tapes, eliminating the need to transport those tapes off-site.

Discovery did the right thing by focusing on an audit first, since abandoned servers are a common problem. “Many companies have servers that are running but not doing anything,” Mines says. He says companies should focus on this and other “quick wins” — such as unblocking air vents and adding blanking panels in data center equipment racks to optimize airflow — before moving to bigger projects, such as server consolidation and virtualization.

Kline followed that same strategy on the cooling side. The company sealed up server racks, moved to a hot aisle/cold aisle design to optimize airflow and then installed high-efficiency chillers. But it also saved energy by simply raising temperature set points. Many data centers are overcooled, so settings can often be turned up without causing problems, says Mines. “It doesn't have to be meat-locker temperatures in there,” he says.

Discovery says that energy savings have approached 20% since the data center was re-engineered, high-efficiency chillers were installed, and server, storage and networking equipment was consolidated.

Outside of the data center, Discovery has

Continued on page 34

COMPUTERWORLD.COM

ONLINE ONLY:

Opinion: Green Two-Step. Look for the "right" capacity, says columnist Howard Rubin.

How Green Are You? Take our quiz and read about ways to get greener.

Data Centers Take the LEED. How two firms earned their credentials.

computerworld.com/topgreen

“We're trying to figure out how you build out a tech center to be green-compliant and take advantage of that.

DAVE KLINE, CIO, DISCOVERY COMMUNICATIONS LLC

Put Your IT Passion to Work

THE MONSANTO EXPERIENCE

At Monsanto, we're passionate about using science and technology to make agriculture more productive. Through our innovations, we help farmers produce healthier foods, better animal feeds and more fiber, while also reducing agriculture's impact on our environment.

At Monsanto, we believe in –

INNOVATION
Advanced science and innovative technology are at the heart of our company. We are committed to developing science based solutions to make our farmer customers more productive and profitable.

AGRICULTURE
Making agriculture stronger helps people feel that they are making a difference by feeding the world while preserving the environment.

EXCELLENCE
People at Monsanto are driven to do extraordinary things and are dedicated to being the best in our industry.

GREAT WORKING RELATIONSHIPS
Monsanto is team based with highly qualified professionals sharing knowledge, creating a great place to work and allowing employees to take ownership for results.

We are seeking to add top talent nationwide in our Information Technology function. Talents being sought include knowledge and experience in the areas of SAP, JAVA, UNIX, Information Security and Project Management.

Visit www.monsanto.com and www.monsanto.com/careers.com to learn more about Monsanto, our passion and our opportunities.

COMPUTERWORLD 100 BEST PLACES TO WORK IN IT 2006

COMPUTERWORLD 100 BEST PLACES TO WORK IN IT 2007

2007 ASUG Impact Award

InformationWeek 500 BUSINESS TECHNOLOGY INNOVATORS 2007

MONSANTO
imagine™

Monsanto values diversity and is an equal opportunity affirmative action employer. M/F/D/V

Continued from page 32

encouraged workers to telecommute and teleconference. IT issues a laptop to every one of its 3,619 employees who require a computer and provides secure remote access and voice-over-IP capabilities. All laptops have power management capabilities enabled, and users are encouraged to turn off the computers at the end of the day. "Thirty percent of the staff telecommutes at least one day a week," says Kline.

In 2004, Discovery installed teleconferencing systems to cut down on business travel. "Teleconferencing has a huge ROI for us because it's a cheaper use of people's time," says Kline.

Discovery declined to disclose exact figures, but Larry Laque, executive vice president of the company's global shared-services unit, estimates that savings are "at least in the six figures."

Kline is also pushing for savings in front-office printing. The business uses networked printers, all of which are on the lightest print setting by default. Many printers are also set to print double-sided pages, and Kline is pushing to expand that.

Energy efficiency plays a role in all IT equipment purchase decisions, says Laque. And for the electricity Discovery consumes companywide, it purchases offsets in the form of wind-power credits from Pepco Holdings Inc., a local utility. "What we can't reduce or recycle, we offset," Laque says.

> **"You have to have the courage to jump in and learn as you go along.**
>
> **LARRY LAQUE,** EXECUTIVE VICE PRESIDENT OF GLOBAL SHARED SERVICES, DISCOVERY COMMUNICATIONS LLC

Overall, Discovery cut its energy bill by 27% in its headquarters, but Laque says the next step will be to apply the principles behind LEED to its data center facility. That's not going to be an easy fit. But, says Laque, "you have to have the courage to jump in and learn as you go along." ■

MICHAEL KLEVETER, ERVIN PHOTOGRAPHY

Ken Kucera, Arvind Thapar and Brenda Dooley of green pioneer First National of Nebraska promote energy-efficient IT to benefit both the business and the environment.

First National of Nebraska Inc.

BY ROBERT L. MITCHELL

3

Omaha
www.fnni.com

What's special: Uses environmentally friendly fuel cells to power its data center. Strong uptime ratings meant the bank could avoid building a backup data center.

What's cheap: Avoids using salt on sidewalks in the winter by channeling the system's waste heat to melt ice.

FIRST NATIONAL of Nebraska Inc. was green before green was cool. The Omaha-based financial services firm took its first bold step in 1999, when it became the first company to build a data center powered entirely by fuel cell technology, which creates electricity by combining a fuel source and an oxidant.

Today, that system delivers 340 kilowatts of power to "the bunker," a 15,000-square-foot section of the data center that houses First National's critical systems for processing credit card transactions. The fuel cells, which emit no greenhouse gases, eliminated the need for uninterruptible power supplies, helping the data center achieve a "seven 9s" uptime rating. "We've never had an outage in eight years," says CIO Ken Kucera.

Using fuel cells came at a cost: 15 cents per kilowatt-hour versus 5 cents to buy power from the grid, says Brenda Dooley, president of subsidiary First National Buildings Inc. But the high uptime levels allowed the company to avoid building a backup data center, and that saved the company $75 million to $100 million, Kucera estimates.

The system has other benefits as well. The fuel cell, which generates waste heat and water vapor, is used for space heating and to melt ice on the sidewalks in winter. The system is a win-win for the business and the environment, Kucera says. "At the end of the day, we get the cleanest, most reliable power," he says.

While First National's use of fuel cells was innovative, it hasn't been replicated since. "There is no other major data center in this country, and possibly the world, that uses a fuel cell system," says Peter Gross, CEO at consultancy EYP Mission Critical Facilities Inc. The

Continued on page 36

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Top Green-IT Vendors

Technology vendors and data center suppliers were also invited to participate in *Computerworld*'s search for the top green-IT companies. These companies completed the same survey as the end-user companies and were judged on the same criteria – most notably, on their IT departments' efforts to reduce energy consumption in their IT equipment and to use technology to conserve energy and lower carbon emissions. Here are the top 12, in ranked order:

1	**IBM** Armonk, N.Y. www.ibm.com
2	**BT Group PLC** London www.btplc.com
3	**Qualcomm Inc.** San Diego www.qualcomm.com
4	**Aplicor Inc.** Boca Raton, Fla. www.aplicor.com
5	**Fujitsu America Inc.** Sunnyvale, Calif. www.fujitsu.com/us
6	**Microsoft Corp.** Redmond, Wash. www.microsoft.com
7	**Hewlett-Packard Co.** Palo Alto, Calif. www.hp.com
8	**Network Appliance Inc.** Sunnyvale, Calif. www.netapp.com
9	**Other World Computing** Woodstock, Ill. www.otherworld computing.com
10	**Verizon Wireless** Basking Ridge, N.J. www.verizonwireless.com
11	**Computer Sciences Corp.** Falls Church, Va. www.csc.com
12	**Sun Microsystems Inc.** Santa Clara, Calif. www.sun.com

Continued from page 34

reason: complexity and cost. Because fuel cells don't respond well to spikes in load, the system needs flywheels to store energy and provide transitional power. A complete system like First National's takes as much floor space as a tennis court, he adds.

However, an emerging fuel-cell technology based on solid oxide could make fuel cells more attractive for data centers. Technology from start-up Bloom Energy Corp. in Sunnyvale, Calif., shows the most promise. "It will be the first fuel-cell technology that will be commercially attractive and [cost-competitive] with the utility," Kucera says.

The pursuit of energy efficiency is a directive from top management, and managing electricity costs is one of the criteria on the scorecard that management uses to evaluate IT.

To further conserve power, Kucera has overseen a massive consolidation of servers, storage and networking infrastructure throughout the 190,000-square-foot facility. That effort consolidated 572 Windows servers onto virtual machines that run on server blades. The number of servers has grown to 750, but everything still fits onto 110 server blades that take up just two racks.

All storage has been consolidated onto three storage-area network subsystems. Some 100 firewalls have been consolidated to just 14. And about 40 Solaris Web hosting servers were consolidated onto a System z mainframe using IBM's Integrated Facility for Linux.

"That makes a ton of sense. The arithmetic is very compelling," says Christopher Mines, an analyst at Forrester Research Inc. Kucera estimates that the consolidation saved $19 million in infrastructure costs. Today, despite substantial growth in the data center, overall power consumption has remained flat.

The re-engineering of the data center's cooling system included a new air-handling system that can push in more air than the old one. The data center also has an economizer that brings in cool outside air during the winter. With the new air handlers in place, air temperatures were raised from 48 degrees to 58 degrees."For every degree warmer that you bring the return air back to the [computer room air-conditioning] unit, you may improve its efficiency by about 1.5%," says Dave Kelley, director of application engineering at Liebert Corp., a cooling equipment provider.

Now IT has turned its attention to the 3,500 PCs in First National's front office. It is evaluating energy-efficient thin clients and virtual PC technologies such as Citrix Presentation Server, as well as offerings from IBM and VMware Inc. Virtual PC technologies haven't been adopted widely to date, but green initiatives are pushing them back into the limelight, says Mines. Some financial services firms, he says, have reported reductions in power consumption of 40% by using the technology.

First National is hoping for similar results. "We're testing in the first quarter and plan to move half of the company onto [virtual PCs]," says Arvind Thapar, vice president of systems and infrastructure. ■

THE BEST PRACTICES OF THE TOP 12 GREEN-IT COMPANIES AND VENDORS

All 24 companies do the following:

1. **Encourage employees to identify, suggest and promote practices that save energy.**
2. **Have purchasing practices that favor energy-efficient products.**
3. **Measure electricity consumption for IT equipment and data center infrastructure.**
4. **Have performed audits or assessments of IT and data center power consumption.**
5. **Use power management software.**
6. **Have improved IT equipment energy efficiency by at least 5% in the past 12 months.**
7. **Have revised data center layouts (or designs) to reduce power demand.**
8. **Have programs to recycle unused or discarded high-tech equipment.**
9. **Recycle IT-related consumables (e.g., printer cartridges and paper).**
10. **Explicitly encourage telecommuting and provide the necessary equipment and support.**

Perkins+Will

BY GARY ANTHES

PHOTOGRAPH COURTESY OF PERKINS+WILL

P+W's facilities are designed to be not only power-efficient but also pleasing to the senses.

IN 1916, when he was just 12 years old, Larry Perkins watched his father dedicate the first parcel of the Forest Preserve System in what is now Deer Grove in Cook County, Ill. He would later describe his father's vision as one of creating "green intervals for people to enjoy."

A devotion to "green" goes way back at Perkins+Will Inc., the Chicago-based architecture, engineering and construction company that the late Perkins co-founded in 1935.

For decades, the company's devotion to what it calls "sustainability" was driven by its clients' desires for workspaces that were kind to the senses as well as efficient in their use of power and water. But there wasn't a comprehensive green program for internal functions, says CIO Richard Nitzsche. P+W had brought in consultants to help, but they "didn't really give us the critical mass internally to progress as much as a lot of our peers, frankly," he says.

The arrival in 2004 of Peter Busby, an eminent Canadian architect and authority on "green design," was the catalyst, Nitzsche says. "Peter really infused the firm with a very strong ethic of sustainable design," he says.

Now, every P+W office has a "green team," and the company has a Green Operations Plan for six areas: transportation, office water use, office energy use, office consumables, indoor air quality, and office renovations and new construction. Although green IT initiatives play a role in each area, they are concentrated in office energy use.

Like many design firms, P+W has a "rendering farm" through which architects can tap into idle desktop cycles during off-hours to run compute-intensive design software. But P+W has taken the idea a step further than most companies. Previously, employees left their PCs on overnight, but now they turn them off. When designers want to do renderings — which turn design specs into images — they use Wake-on-LAN hardware and software in the PCs to power them up.

4

Chicago
www.perkinswill.com

What's special: Developed a Green Operations Plan focused on office energy use that encompasses six areas: transportation, office water use, office energy use, office consumables, indoor air quality, and office renovations and new construction.

What's cheap: Users can turn off their PCs at night, thanks to a new system capable of waking up the machines when they're needed for the firm's "rendering farm."

P+W also has server virtualization program. The original goal was to cut spending on server purchases, but server prices have fallen so much that the big savings now come from reduced spending on energy, Nitzsche says.

Nitzsche says he and his staff have to understand sustainability principles to effectively execute IT's internal green initiatives. But the need for such expertise is even greater for staffers who interact with the firm's designers and architects. Nitzsche has earned Leadership in Energy and Environmental Design (LEED) professional accreditation from the U.S. Green Building Council, and he encourages his employees to do the same. LEED accreditation helps build a bond with the architects, he says.

Frank Gens, an analyst at market research firm IDC, says the IT staff at P+W enjoys a huge advantage in working with a management team long convinced of the importance of sustainable policies. He says economic considerations will be the key driver for green IT — especially as governments establish more incentives and penalties. But, he says, customers' increasing desire to buy from environmentally responsible suppliers will work in P+W's favor. "You're seeing a rising awareness of the importance of reducing the impact you have on the environment," Gens notes.

Paula Vaughan, an architect and co-director of P+W's Sustainable Design Initiative, says IT was "one of the first places we looked," both because of its considerable energy usage as well as its importance to sustainability efforts on behalf of clients. She says P+W is moving to Rivet, Autodesk Inc.'s building-information modeling software, which can facilitate green design efforts by, for example, showing the solar effects of different building positions.

"Usually when you think about green IT, it's about data centers and servers and equipment, but for us, it is much more ingrained in our business," Vaughan says.

Nitzsche says sustainability has been such a core principle at P+W for so long that there is no resistance to it from employees. "The only real difficulty is having the manpower to roll all this stuff out," he says. "We are a very lean operation." ■

Snohomish Public Utility District

5

Everett, Wash.
www.snopud.com

What's special: Puts its more than 1,000 desktops to sleep when they become inactive, through the use of customized software originally developed by the EPA.

What's cheap: Developed a public awareness campaign to reduce power consumption at local school districts and area businesses.

BY JENNIFER McADAMS

A SUCCESSION of sweltering days gripping the Pacific Northwest in the summer of 2006 threatened to leave the Snohomish County Public Utility District (PUD) in Everett, Wash., without enough power to meet the demands of area residents. This near-miss crystallized the need to find new ways to cut energy consumption.

Even before the heat wave, officials at the Snohomish PUD were weighing initiatives to save money and power because local population figures were skyrocketing. But early into their efforts, the officials realized that just as important as the utility's environmental conservation efforts was the need to set an example for the community.

Over the past 18 months, the PUD has instated a broad range of power management initiatives. For instance, the utility now puts its more than 1,000 desktops to sleep when they become inactive, using customized software originally developed by the U.S. Environmental Protection Agency. Also under way are changes in the physical setup of PUD data centers and the IT equipment housed in those facilities.

Officials also emphasize the strength of the utility's public awareness campaign. It's reaching out to school districts and area businesses, such as aerospace giant The Boeing Co., to hammer home the importance of conservation. "Our customers want a utility that is thinking about the big picture and about the future," says Steve Klein, the PUD's general manager. With the big picture in mind, the PUD cleaned its own house first with tactical steps to reduce energy use. Desktop operations quickly emerged as the area most likely to yield the highest savings.

"After we worked with Hewlett-Packard to replace some of our equipment, which was consuming far too much energy, we moved on to something that promised to have even bigger savings," recalls Kevin Lanum, the PUD's infrastructure systems analyst.

In that next phase, the IT staff de-

The bungee cord for the modern IT executive.

The Snohomish County PUD's Chris Thorpe, Steve Klein, Martha Hobson and Kevin Lanum are working on a range of green initiatives launched in response to a 2006 heat wave.

NEIL NEROUTSOS

cided to use an open-source tool called EZ GPO (Group Policy Objects) to shut down computers when they're not in use. Developed by the EPA, EZ GPO provides a way to control power management settings using resident APIs.

IT officials used EZ GPO in a pilot test that ran from July to October 2007 to determine how much energy the PUD would save if PCs stopped running after employees had left for the day. The EPA's free software worked well on some PUD equipment. Still, applications installed on many of the computers would override EZ GPO's attempts to put them to sleep, even though the devices weren't in use.

"We devised an additional scripted solution that runs scheduled tasks every half-hour and checks to see if anyone has logged into computers. If the computers are idle, they are put into standby mode," says Steve Reynolds, a developer at The Cadmus Group Inc., a Watertown, Mass.-based firm that worked on the PUD's conservation efforts.

The IT staff combined changes to Windows Task Scheduler, Visual Basic Scripting and a free utility from Microsoft called PS Shutdown.exe to attain substantial savings documented over the three-month pilot. During that time, average workstation wattage dropped from 67.5 to 20.2 watts. In total, the PUD projected savings of 414.9 watts per PC per year, which would yield a cost savings of $25 per machine.

The utility is also changing its data centers. "We are planning a mass migration in 2008, when we will consolidate 12 racks of servers down to three blade servers. Along the way, we will replace our air handlers and reduce the overall size of our data centers," says Chris Thorpe, senior manager of IT operations.

The PUD's efforts are far from the norm, attests Christopher Mines, an analyst at Forrester Research Inc. "There is a series of disconnects that are prevalent in large corporations between IT that uses the energy and the facilities that purchase, manage and pay for it," he says. "We need a much more concerted push by all of these parties to identify, assess and then initiate efforts to reduce energy consumption." ■

McAdams *is a freelance writer in Vienna, Va. Contact her at JMTechWriter@aol.com.*

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JILL HATZAI

There's plenty of "low-hanging fruit" that can reduce emissions at organizations while also saving money, says WWF CIO Greg Smith.

World Wildlife Fund

6

Washington
www.worldwildlife.org

What's special: Uses virtualization software and blade servers to reduce energy consumption and air conditioning requirements.

What's cheap: Installed videoconferencing technology to reduce the need for expensive, carbon-emitting travel.

BY STACY COLLETT

AT World Wildlife Fund, going green was en vogue long before global warming predictions peppered the news, and film documentaries on the subject garnered Academy Awards.

"We've been doing a lot of things to benefit the Earth and the environment for more than 40 years," says Greg Smith, CIO at the Washington-based nonprofit conservation organization. "WWF has an overall responsibility to be green for the planet and to set an example for the rest of the world." Now that mission has expanded to the IT department.

For starters, last June, WWF teamed up with Dell, Intel, Hewlett-Packard, IBM, Microsoft and other industry heavy hitters to launch the Climate Savers Computing Initiative, which will encourage energy-saving designs for servers and desktop and notebook computers.

In its own data centers, WWF is combining energy-saving technologies that provide a one-two punch for getting green and saving money.

The organization uses VMware virtualization software along with blade servers to reduce energy consumption and air conditioning requirements. Application portability — the practice of running software from a remote server rather than on the user's computer, with no changes to the local computer's operating system, file server or registry — also saves money and energy.

Blade technology in the virtualization environment uses less power and is less expensive than traditional servers.

It hasn't always been easy to make green IT choices, Smith says, but in recent years, the top-tier vendors have made the options more plentiful.

"Just because a piece of technology might be 'green,' that might not mean it's the best option for an organization," he says. "I'm looking for the best products at the best price that can then fit into the model of being green."

Energy- and emissions-saving measures don't have to be expensive. There's plenty of "low-hanging fruit" that can lower CO_2 emissions while saving money and time, Smith says.

For example, the organization uses and promotes Web collaboration systems such as SharePoint, WebEx and Citrix MetaFrame XPA.

Instead of flying to WWF's Geneva offices five times a year, for example, Smith usually opts for eight-hour videoconferences. For each trip he passes up, he estimates that he saves about $700 on plane tickets, 15 hours of travel time and $3,000 in expenses. "I'm reducing my CO_2 emissions significantly, and I'm saving time," he explains.

"Videoconferencing and the greening of businesses are certainly a good match," says Henry Dewing, a Forrester Research Inc. analyst. "A lot of companies are talking about the return on investment in terms of the reduced cost to their travel budgets. Some of the larger videoconferencing [vendors] are looking at actual tools to quantify the reduction of carbon output based on reduced travel from cars and airplanes."

Here's more low-hanging fruit: To reduce electricity use, WWF purchases Energy Star-compliant computers and networking printers, employees use power management settings on PCs, and IT staffers set network printers to go into sleep mode when they're not in use. Though exact savings are hard to quantify in many of these devices, manufacturers say such features can help customers cut power consumption by up to 80%.

"It's one of a number of things that we're doing on the green side to make the Earth a better place for the next generation," Smith says. ■

Collett *is a* Computerworld *contributing writer. Contact her at Stcollett@aol.com.*

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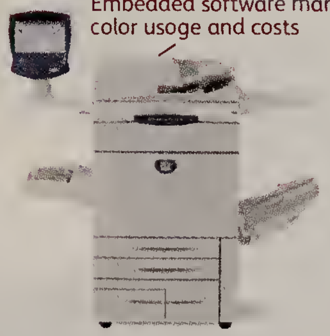

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Austin Energy

7

Austin
www.austinenergy.com

What's special: Uses server virtualization to run 600 servers on just 150 physical machines, thus slicing energy use by 40%.

What's cheap: Receives 35% of revenue online.

BY JULIA KING

AUSTIN ENERGY is no Johnny-come-lately to energy efficiency among U.S. companies. The $1.2 billion power company estimates that it has saved energy equivalent to the output of a 660-megawatt power plant since 1985, when it launched the first in an extensive lineup of innovative energy conservation and renewable resources programs. Austin Energy's goal is to boost that total savings by an additional 750 megawatts of power by 2020.

Also, for the sixth year in a row, the city-owned power company ranks as the No. 1 seller of green energy, including solar and wind power, among all U.S. electric utilities.

"We pride ourselves on being one of the most progressive utilities in the world," says CIO Andres Carvallo.

The most important goal of Austin Energy's energy-saving initiatives is reducing reliance on electricity and thus lowering overall carbon dioxide emissions. To reach that goal, it plans to use technologies such as smart appliances to monitor and control power usage at customer sites. The utility also plans to implement new server and storage technology, including multicore CPUs, virtualization, and de-duplication and compression techniques in its own data center.

Currently, the company's 1,600-person IT department is running just over 600 servers on 150 physical machines. This translates to 40% energy savings, says Carvallo.

Austin Energy's IT group manages 195,000 real-time devices used for automated electricity metering and distribution. That number will increase to 500,000 devices by early 2009. The company also now receives 35% of its revenue online, up from no online payments in 2003.

Henry Wong, a member of The Green Grid consortium, lauds Austin Energy's IT efforts, which have enabled the utility to communicate with customers about their time-sensitive power requirements. A so-called smart power grid, which delivers power when needed and conserves power when it isn't needed, would be impossible without such communication, he says.

"We know that technology can facilitate that with better automation and controls," adds Wong. "Austin Energy is willing to become the proving ground by offering that automation to monitor demand and have systems capable of being able to react to that demand." ■

"Go after the quick wins first," says WellPoint President and CEO Mark Boxer.

MANUELLO PAGANELLI

WellPoint Inc.

8

Indianapolis
www.wellpoint.com

What's special: Moved its data center from California to Virginia, saving $13,000 a month.

What's cheap: Focuses on small improvements, like increasing recycling and using recycled paper.

BY GARY ANTHES

WHEN WELLPOINT INC. buys a server from Dell Inc., it voluntarily pays the vendor an extra $40. When it buys an ink-jet printer, it happily ponies up another buck over the purchase price.

The health benefits company was a founding partner in Dell's "Plant a Forest for Me" program, in which Dell and

Ryder System

9

Miami
www.ryder.com

What's special: Implemented a server consolidation effort that reduced 100 discrete Wintel servers into 66 Energy Star blades.

What's cheap. Eliminated Styrofoam cups and placed recycle bins on every floor in every building.

BY MARK HALL

A COMPANY gets motivated to cut energy consumption for many reasons. Government regulations, saving money and public relations are near the top of the list, says Rob Vieira, buildings research director at the Florida Solar Energy Center, a research institute at the University of Central Florida in Orlando.

But, he says, efforts to become energy-efficient are most effective when "the environmental ethic" is part of the corporate culture.

That's the case at Ryder System Inc. Nanci Tellam, director of environmental services, says the company charts every kilowatt used per square foot in all of its locations and generates reports to identify and address anomalies.

Most important, she says, Ryder squeezes every mile per gallon it can from its 160,000-strong vehicle fleet by working directly with Freightliner to make trucks more gas-efficient, using only low-sulphur diesel fuel and training its drivers to be fuel-conscious.

Michael Pivowar, vice president of technology services and operations, says Ryder "has a mandate that comes down from [CEO Gregory Swienton] to save energy. IT is just one component."

But that component is a pretty large one. IT cut its 2007 energy consumption by 15% over 2006, according to Ryder's facility department. Much of those savings come from a server consolidation effort that reduced 100 discrete Wintel servers into 66 Energy Star blades, Pivowar says. And another 400 servers have been identified as candidates for virtualization, he says.

Since 2001, the IT department has instituted telecommuting for 60 of its 380 IT workers, Pivowar says. That saves energy by allowing the company to use less office space, and it further helps the environment by reducing the number of cars on Miami highways, he notes.

Later this year, the IT department will open a new data center in an Energy Star-certified building under construction in Michigan. According to Pivowar, Ryder will consume 6.5 million fewer BTUs annually than it would have in a noncertified three-story facility, resulting in 1,400 fewer tons of greenhouse gases released into the atmosphere every year.

Wayne Kernochan, an analyst at Illuminata Inc., lauds efforts by users like Ryder. By implementing energy-saving polices today, he says, "you're cutting down on problems further down the pike." ■

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volunteering customers pay conservation groups to plant trees to offset the carbon emissions produced by powering computer devices.

Mark Boxer, president and CEO of WellPoint's operations, technology and government services business unit, says there are "three legs to the stool" of the company's green initiatives. First are "continuous small improvements, like increasing recycling, moving toward green paper and the like." Second are big, one-time initiatives such as replacing the firm's enterprise data center, a multiyear effort that was completed in 2003. Third are special partnerships, like WellPoint's linkup with IBM to implement best practices and technologies such as server consolidations.

Boxer says savings from these efforts can be difficult to compute, but the company cut expenses $13,000 a month by moving its California data center to Richmond, Va., and upgrading it to more efficient gear.

Several years ago, WellPoint became sharply focused on becoming more efficient, especially on reducing administrative costs, and that was the initial emphasis in its conservation efforts, Boxer says. As a result, the company has reduced IT spending per staffer by 5% in each of the past three years. But with the drive for overall efficiency came a "social mission" and a "desire to be a better citizen," he says.

Dave McDonald, vice president of infrastructure support services, cites a push to substitute videoconferencing for travel as a successful green IT initiative. He says employees will spend 25,000 hours at videoconferencing this year, avoiding 4,500 tons of carbon dioxide emissions from cars and planes.

WellPoint is a partner in Dell's 'Plant a Forest for Me' program.

McDonald says WellPoint eliminated 900 older, inefficient computers through server consolidations and replaced most of its old CRTs with more energy-efficient LCD monitors. He says the company is now evaluating new high-efficiency cooling technology from IBM for several data centers. Also, WellPoint is looking at more environmentally friendly alternatives to tape for data storage.

Of videoconferencing, McDonald says, "People here were kind of scared of it. They didn't know if it was hard to do or how it worked. But once they used it, it was an easy sell."

Indeed, some resistance to green initiatives is to be expected, Boxer says. "A lot of the improvements are about removing entitlements," he says. "Does everyone need a printer in their office? Does everyone need to travel to meetings? Moving away from these mind-sets requires very senior sponsorship."

Frank Gens, an analyst at IDC in Framingham, Mass., says IT must have support from the business units to overcome user resistance. "It's hard for IT to drive that kind of cultural change on its own," he says. "That's a losing hand for the CIO."

"Go after the quick wins first," Boxer advises. "There are immediate opportunities that don't require a big capital investment. Also, look outside your four walls. We don't have the market cornered on best practices." ■

Wendell Fox and Sharon Dorsey spearhead green efforts like cell phone recycling at Marriott.

PHOTOGRAPH COURTESY OF MARRIOTT INTERNATIONAL

Marriott International

10

Bethesda, Md.
www.marriott.com

What's special: Building a second data center 300 feet below ground in a former Pennsylvania mine, where the ambient air temperature is 53 degrees Fahrenheit.

What's cheap: Replaced 38 public printers at its headquarters with more-efficient Energy Star devices.

BY THOMAS HOFFMAN

MARRIOTT International Inc.'s efforts to lower its IT power consumption over the past few years reads

Continued on page 46

Monsanto Co.

11

St. Louis
www.monsanto.com

What's special: A glass screen in its new data center blocks 60% of the sun's rays, lowering demands on the building's cooling systems.

What's cheap: Working to reduce waste in its manufacturing processes and help farmers to prevent soil runoff.

BY THOMAS HOFFMAN

WHEN MONSANTO CO. began designing a new $21 million data center in Creve Coeur, Mo., about five years ago, it was a decidedly green effort from the get-go. The 40,000-square-foot facility, which was completed last July, was designed with a 17-foot floor-to-ceiling span to promote airflow and eliminate the need for power or cooling units on the data center's floor. And the glass screen that covers the front of the building isn't just aesthetically pleasing: It can withstand the wind force of an F3 tornado and screens 60% of the sun's rays, thus lowering the demands on the building's cooling systems, says CIO Mark Showers.

Officials hope that design elements like these will help the building earn a LEED certification from the U.S. Green Building Council. The USGBC awards LEED, or the Leadership in Energy and Environmental Design, certification to buildings that meet certain prerequisites and achieve performance points in areas such as energy efficiency and indoor environmental quality. According to Ashley Katz, a spokeswoman at the USGBC, there are just three LEED-certified data centers in the U.S.

Monsanto's hub is expected to save the St. Louis-based agricultural giant 27% of the energy consumed by a conventionally designed data center.

The new data center reflects Monsanto's ongoing efforts to gradually reduce its global IT power consumption. Over the past decade, the company has consolidated more than 10 geographically dispersed data centers around the world into a single hub, says Showers.

Monsanto's IT aggregation has been aided by its server consolidation and virtualization strategies. Over the past three years, Monsanto has eliminated 334 servers, and it is running just 16 Windows- and Linux-based machines today, thanks in part to its use of VMware virtualization software, says Showers.

Monsanto hasn't tried to calculate the energy savings that the server reduction has generated, but Showers says the move has yielded a "major" reduction in energy costs and heat to be dissipated.

Monsanto's green culture has made its data center investment and other IT power-saving initiatives an easy sell for Showers and his 1,200-person team. Thanks to the company's commitment to environmental conservation, he says, "it's just not a difficult conversation" with senior executives. ■

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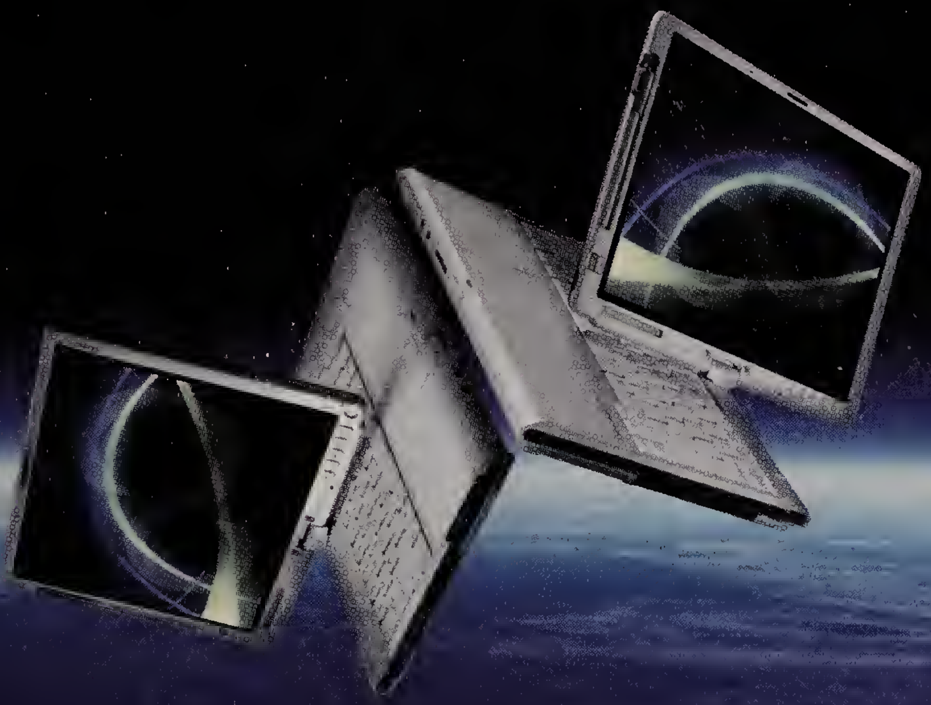

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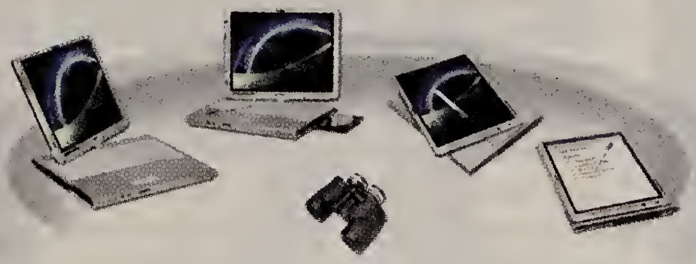

intel Centrino inside
Core 2 Duo inside

FUJITSU
THE POSSIBILITIES ARE INFINITE

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like the ultimate "green makeover" list.

Virtualization software from vendors such as VMware Inc. has helped the hospitality giant reduce its server population by more than one-third over the past three years. Storage virtualization and archiving technologies have enabled the company to slash its storage energy costs by more than 50% over that same period. And five of the 10 rooftop air-handling units above the company's data center were replaced with the highest-rated units available (a SEER, or Seasonal Energy Efficiency Ratio, of 13).

But probably the coolest thing Marriott is doing right now is taking place 300 feet below ground, in a former Pennsylvania mine. There, in a facility owned by Iron Mountain Inc., the company is building a second data center that it expects to complete by year's end. The mine maintains an ambient air temperature of 53 Fahrenheit.

"By choosing this location, we are absolutely certain that we'll be able to lower our power consumption from an equipment-cooling perspective," says Wendell Fox, senior vice president of Marriott's information resources shared-services group.

Although Marriott's subterranean lair might sound a bit unusual, it isn't all that uncommon, according to IDC analyst Chris Ingle. He points to a British retailer that owns vast stretches of underground tunnels and is using one as a disaster recovery site. "There are often quite interesting things that larger companies can do to make use of these resources," says Ingle.

Marriott has also replaced more than 5,000 desktop PCs with thin clients, cutting power consumption per device by 50%. Last year, Marriott replaced 38 public printers at its headquarters with more-efficient Energy Star devices. That helped reduce its carbon footprint by 36 tons annually, says Sharon Dorsey, senior director of Marriott's information resources technology management center. That's nearly the same amount of CO_2 discharged by a Hummer driven 60,000 miles a year.

Of course, some of Marriott's applications aren't conducive to virtualization, including its reservations system and other tools with high-availability requirements, says Fox. Still, the company is archiving some data that's infrequently accessed onto slower-speed spindles. Fox says a disk drive that spins at 7,200 rpm consumes eight times more power than a disk spinning at 3,700 rpm. Ingle says Marriott's approach reflects what many other companies are starting to do.

Marriott has slashed its storage energy costs by more than 50% over the past three years.

Marriott has also become environmentally sound in the disposal of IT assets. Since contracting in 2005 with Intechra LLC, a Jackson, Miss., asset disposition company, Marriott has recycled more than 18,000 printers, monitors, peripherals and other systems, says Dorsey. That represents nearly 200 tons of plastics, transistors and other materials that didn't end up in landfills.

As a mother of two, Dorsey says, "it's important to me that I help leave a legacy to my kids so that there's a world for them to live in in the future." ■

Wachovia Corp.

12

Charlotte, N.C.
www.wachovia.com

What's special: Rolled 15 unique reporting tools into a single managed-service environment.

What's cheap: Scouting locations for its next-generation data centers that are "cheap, cold and safe."

BY STACY COLLETT

WACHOVIA CORP. has pledged to reduce its greenhouse gas emissions profile by 10% by 2010. The fastest way to reach that goal, executives have determined, is by reducing energy consumption — and energy-guzzling IT operations have been one of the financial services firm's main targets.

In 2004, Wachovia's corporate and investment banking management team adopted a new mantra for technology deployment: Remove two or more things and replace them with one. The team started with DataSynapse Inc.'s GridServer resource-allocation product and then expanded into reusable SOA-based managed services for reporting, data transformation, application messaging, Web hosting, J2EE and file services.

"We had 15 unique reporting tools when we started," says Jacob Hall, vice president and head of platform design and data centers for corporate and investment banking. "We picked two off-the-shelf [applications] that we would build a managed service around."

Using managed services, power consumption was reduced by a factor of five.

The Charlotte, N.C.-based firm also determined that it had to get smarter about power consumption, heat dissipation and cooling in its data centers.

At Wachovia's 225,000-square-foot Birmingham, Ala., data center, IT staffers began with an efficient and dense computing deployment. New grid capacity was implemented using Verari Systems Inc.'s BladeRack 2, which features a chassis that can hold 61 servers. Because all the computers are in the chassis and they're vertically cooled (hot air rises to the top), Wachovia is able to cool the servers more efficiently.

These and other technologies will be deployed in the firm's new financial center, slated to open at the end of 2009. In addition to saving energy, they will help cut construction costs by up to $80,000.

The firm also plans to implement Hewlett-Packard Co.'s Dynamic Smart Cooling technology in the Birmingham data center and the new financial center.

"We will fully instrument and measure airflow and temperature at the rack level, with sensors being placed throughout the racks in the data center," explains Joe Stephenson, vice president of data center management. "The sensors will feed into our computer-room air conditioners and will modify those settings as needed." Stephenson says he expects to see a return on investment within five years. ■

COMPUTERWORLD'S TOP 12 GREEN-IT COMPANIES

Reducing IT's energy bill is the easy part. Going green gets complicated when you try to master issues like renewable energy and responsible recycling. By Mary Brandel

THE GREEN MAZE

A FEW MONTHS AGO, Harvey Betan, a business continuity consultant in New York, was helping a client interview a potential disaster recovery facility provider. There was nothing unusual about the meeting until the client asked an eye-opening question: Did the provider use alternative sources of energy, like solar or wind power? No, it didn't, but the discussion continued as Betan and his client — Jeff Saper, CIO at strategic communications firm Robinson Lerer & Montgomery LLC — drove away in Saper's hybrid Ford Escape.

"I thought it was the perfect opportunity," Saper says. "They were on top of a hill with a flat warehouse facility that easily could have housed solar [panels]." Saper passed on that vendor and is looking farther north, in upstate New York.

Clearly, environmental concerns are near and dear to Saper's heart, and not just for the sake of the bottom line. In his mind, it is IT's responsibility as the biggest consumer of electricity in the company to set an example not just for reduced energy consumption and efficient computer use, but for all things green. Through his own IT-initiated green program, backed by the CEO, Saper has reduced servers 50% to 75% through virtualization and adjusted the data center's cooling system for peak efficiency. And he purchases only Energy Star equipment that also meets environmental criteria set by the Green Electronics Council and the U.S. Environmental Protection Agency.

The firm also donates old equipment to charitable organizations or disposes of it through Dell Inc.'s asset recovery program. Moreover, it has moved some users to thin clients and all to LCD monitors, equipped employees with laptops and broadband so they can work from home, bought solar-powered battery adapters for users' BlackBerry devices and Razr phones, and configured Microsoft Active Directory to automatically power down PCs and monitors. Plus, employees are continuously educated on actions they can take, like printing documents double-sided and buying reusable water bottles.

BRICK WALLS

But there's always more to do, Saper says, and it doesn't take long before you hit a brick wall (note his ongoing search for a green disaster recovery facility). The fact is, although it has become fairly straightforward to buy energy-efficient PCs and reduce the electrical load of data centers, there's nothing simple about tackling the full gamut of environmental issues raised by the corporate world's dependence on technology.

Outside the data center, the trade-offs and complexities of going green are many. Before purchasing an energy-efficient fluorescent light bulb, for instance, you might want to research how to dispose of it, considering that it contains small amounts of mercury. And if you purchase natural products from environmentally conscious companies, you might be surprised to learn how often those Earth-friendly ingredients are shipped from overseas locales, adding to the world's carbon emission load.

It's no different in IT. As Simon Mingay, an analyst at Gartner Inc., puts it, "The more you know, the more you know you don't know."

Take the Green Electronics Council's Electronic Product Environmental Assessment Tool (EPEAT). The online tool helps companies compare computer equipment based on an exhaustive list of environmental attributes, such as percentage of toxic and recycled materials, energy efficiency, ease of disassembly, upgradability, packaging, take-back options and performance criteria. However, EPEAT evaluates only monitors and PCs, and it doesn't yet take into consideration the equipment's "embodied energy," or the amount of energy that went into manufacturing, assembling, shipping and distributing the product and all its parts.

"It only looks at the end-use phase, because that's what everyone understands," Mingay says. But research suggests that embodied energy is where the focus should eventually be, because there's about an 80-20 split between the energy consumed in making and distributing a product and the energy consumed in using it, he says. That is the next frontier for vendors to begin differentiating themselves, says Mingay.

> **"The essence of green IT is what you buy, how you use it, how you get rid of it and what problems you apply it to.**
>
> **SIMON MINGAY,**
> ANALYST, GARTNER INC.

Indeed, it takes a truly green mentality to tackle such complexities, which are less easy to cost-justify than, say, adjusting the cooling system in your data center or moving to energy-efficient equipment. A truly green approach involves taking strategic measures like re-architecting your computing infrastructure, researching renewable energy, recycling responsibly and rethinking how technology can improve material efficiency and even reduce carbon and greenhouse-gas emissions. Examples include investing in videoconferencing and remote collaboration tools to cut down on travel, or using Web portals rather than paper to disseminate information.

Initiatives like Energy Star and EPEAT "only address one question, which is what you buy," Mingay says. "The essence of green IT is what you buy, how you use it, how you get rid of it and what problems you apply it to."

BEYOND THE LOW-HANGING FRUIT

In other words, while it's pretty easy today to create a business case for minimizing energy consumption, the easy ROI stuff goes only so far. Organizations can cut costs 10% to 25% in the first year of an energy-saving program, with little expenditure, Mingay says. "But the challenge will come after the low-hanging fruit — what do you do then?" he says. "In the U.S., what's motivating most organizations to act is primarily about saving energy or money, and the environmental benefits are at best secondary, if not incidental."

One company that's reaching beyond the low-hanging fruit is Citigroup Inc. In 2003, it launched an initiative to reduce the number of its more than 54 data centers around the world and determined that, wherever possible, new data centers that it builds would conform to the Leadership in Energy and Environmental Design (LEED) standard developed by the U.S. Green Building Council.

One of the biggest challenges, says James Carney, head of data center planning and analysis in Citigroup's technology infrastructure group, was finding building designers and suppliers who understood that while sustainability was a top goal, the company couldn't compromise on performance and reliability. Also, a lot of research went into selecting materials that were environmentally sound from cradle to grave.

Citigroup also worked to choose geographic locations where the utility companies had enough supplemental power to service the data center without building new infrastructure. It also tried to find providers of green energy, which was easier in Europe than in the U.S. The company's data center in Frankfurt, for instance, will run on electricity primarily generated by hydropower, which doesn't generate carbon emissions, according to John Killey, head of Citi Realty Services in Europe, the Middle East and Africa. By year's end, he says, 30% of Citigroup's data center energy in Europe will have a zero-carbon footprint.

But according to Carney, it's getting easier to go green, now that the notion of sustainability has grown in the computing world. "Five years ago, vendors said, 'Why are you even asking us these questions?' " he says. "Now, they can tell us their equipment has *x* amount of reduction in terms of embedded carbon."

A big advantage that Citigroup had is that its technology infrastructure group already worked closely with its realty services unit, which isn't the case at many companies. The groups worked together on site selection, design, construction and disposal of the old data center equipment. "If people have different mind-sets from the IT and facilities worlds, it creates a lot of tension and you won't have a successful project," Carney says.

GETTING TO SQUARE ONE

Indeed, until both IT and the facilities groups share responsibility for the electric bill, IT has little incentive to care about reducing its power usage, says Christopher Mines, an analyst at Forrester Research Inc. In fact, for some companies, just making IT and the end-user community more environmentally aware is a challenge.

For example, according to Betan, it's rare to find an IT organization concerned about properly disposing of its computer equipment after a disaster. And in many cases, he says, he still sees data centers with big air conditioners blowing cold air indiscriminately to the entire room. "We talk to them about other options, but they haven't yet thought of it themselves," Betan says.

Lloyd Mainers, U.S. East Coast manager for Sandy, Utah-based SubZero Engineering, agrees that awareness is low. His company develops computational fluid dynamic (CFD) models to visually illustrate how hot and cold air flows in a data center. Companies can use those models to take simple steps — like balancing airflow, filling holes in the floor or moving the perforated tiles that blow air — to cool their computer equipment more efficiently.

"We find that most data centers have far more AC than they could ever need, but no real thought has been given to moving the cool air to where it's needed," Mainers says. According to The Green Grid consortium, companies could save 25% of their energy costs by implementing recommendations that result from CFD models.

Indeed, according to Mines, while awareness of environmental concerns is growing in enterprise IT organizations, there aren't many tangible activities backing up that awareness. In a recent Forrester survey of 124 procurement and operations professionals in IT, he says, only 29% of the respondents identified data center power and cooling as important issues.

> **"As hard as it is to reconfigure the data center, it's even harder to get people to change, even when it comes to basic stuff like turning off the lights.**
>
> **CHRISTOPHER MINES,**
> ANALYST,
> FORRESTER RESEARCH INC.

Beyond the data center lie even more challenges, Mines says, particularly in terms of changing behaviors and developing well-followed green policies and processes. "As hard as it is to reconfigure the data center," he says, "it's even harder to get people to change, even when it comes to basic stuff like turning off the lights."

For instance, he says, just 20% of survey respondents said they have rewritten their procurement policies to include environmental criteria. Other policies that need to be reviewed include those that govern how companies dispose of old equipment. "It's a classic issue where IT people, facilities, finance and security all have to be involved because they all have a stake and somewhat contradictory and overlapping goals," Mines says. Facilities might see old gear as junk, for example, while finance might want to maximize the return on investment.

The EPA is all too aware of the difficulty of changing behavior. It recently launched a multipronged campaign to educate companies on the merits of using PC power management features, which switch computers to low-power mode after a period of disuse. The EPA is fighting a long tradition of IT organizations disabling power management settings that in the past have caused computer freeze-ups and interfered with automated maintenance processes, such as overnight patch management.

"Computers have changed drastically in how they handle power management, but the myth and attitude has stayed for a long time," says Steven Ryan, product manager at the EPA. The EPA is now working with companies to provide free estimates on the energy savings they can reap by activating power management features, along with free technical service to ease any glitches that these features cause. It has also created educational materials for IT to disseminate to users who want to know why their PCs act differently with the power management features enabled. Ryan says businesses can save $25 to $75 annually per PC using power management.

Despite the challenges of adopting an eco-friendly mind-set, the direction that companies must head in is clear, and it's clear that IT has a key role to play. According to Gartner, by 2009, one-third of IT organizations will include environmental sustainability in their top six buying criteria for hardware and services vendors.

Meanwhile, Forrester believes customers' efforts will evolve from the short-term ROI of energy efficiency to longer-term programs aimed at reducing their overall carbon footprints.

"When people start understanding the strategic risk and strategic opportunities of climate change in terms of its impact on brand value, their market and their operations," Mingay says, "they'll get engaged in a much broader environmental agenda." ■

Brandel *is a* Computerworld *contributing writer. Contact her at marybrandel@verizon.net.*

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TRUE TALES OF IT LIFE AS TOLD TO SHARKY

Control Freak

Remote user calls about a Windows problem, and this help desk pilot fish begins by telling him to press Control-Escape. User: "I don't have a Control key." Fish: Sure you do, at the lower corners of your keyboard. User: "No, I don't have Control keys because I pried them off. They kept getting in the way while I was typing Word documents and messing everything up. What do you use Control keys for anyway?" Says fish, "I told him, 'Just for Word, how about saving, copying, pasting, top-of-page, end-of-page, bold, italicize, find and print, for starters?' Our standing joke now is, 'Hey, if you need a couple extra Control keys, I know somebody who can help you out.' "

Oh, That One!

Support pilot fish at this community college gets a call: Teacher for the computer security class can't get a CD to open on his instructor workstation. "I go to the room and try the drive with a CD I had handy," says fish. "Works just fine – even autoplay works. After I eject the CD, the user comes back and asks, 'Is it working?' Working just fine, I say. 'The CD is in there,' he says. No, it isn't, I say. With that, he opens the drawer to the DVD player also located in the podium near the PC. I take the CD out of the player, put it in the computer, and it runs. Problem solved."

Unforgiving Syntax

Pilot fish sets up an on-site C++ class for a small team of C developers. But one PL/I programmer gets wind of the opportunity and argues to be included in the class. His rationale: "I have had extensive classroom training in C and just a smidgen of C Plus." Reports fish, "I explained to the programmer's manager the meaning of the increment operator '++' in the C language and its very obvious relationship to the name C++. Request denied; prerequisite for C++ class clearly not met as evidenced by the requester's own argument."

Oops!

Junior IT staffer is trying to troubleshoot a problem with a remote PC, and he's not having much luck, so he asks a senior IT manager to have a look. "The manager decided it just needed to refresh the IP address," says a pilot fish in the know. "He connected to the workstation with Remote Desktop, opened a command window and typed 'ipconfig /release.' He then stared at the pop-up message saying that the session was disconnected when the remote PC released its address. The junior IT guy probably laughed the entire drive out to the remote site to restart the workstation."

■ *Boss driving you to distraction? Send Sharky your true tale of IT life at sharky@computerworld.com. You'll score a snazzy Shark shirt if I use it.*

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FRANKLY SPEAKING

Frank Hayes

How Reliable?

HOW MUCH reliability can you afford?

Last Monday afternoon, BlackBerries stopped working again. For about three hours, the CrackBerry addicts couldn't get their mobile e-mail fix. The root cause: an unsuccessful infrastructure upgrade by BlackBerry vendor Research In Motion (see story, page 16).

This outage came less than a year after an 11-hour BlackBerry service outage last April. Root cause that time: a different infrastructure upgrade.

Naturally, BlackBerry users were unhappy. A few industry blowhards said they were furious and grumbled darkly about a backlash against the BlackBerry.

It won't happen. And not just because of the BlackBerry's supposedly iconic status or because users have some irrational affection for RIM.

The analysis is simple: The BlackBerry works, mostly. It's cheap, functional and — most of the time — reliable.

Three hours down out of 7,000 since last April? That's 99.95% reliability. Want more nines? You'll have to pay more.

Probably a lot more.

That's because most users don't need all those nines. They can survive a few hours without e-mail arriving in their pockets. Before the CrackBerry, they did it all the time.

So only a small fraction of BlackBerry users would ante up for service with much higher reliability. That would likely make the cost per user stratospheric.

Cheap, functional, reliable. You get to pick two — at most.

The definition of "mission-critical" is that we choose reliable over cheap. For anything that's truly mission-critical, we spend the money. That's why we have backup generators and redundant T1 lines — because we know drunk drivers plow into electrical substations, trucks skid into telephone poles, and backhoes and boat anchors take out fiber-optic cables.

The analysis is simple: The BlackBerry works, mostly. It's cheap, functional and – most of the time – reliable.

So by definition, BlackBerries aren't mission-critical. They probably never will be. There just aren't enough users willing to pay for the battle-hardened, fully redundant BlackBerry infrastructure that more nines would require.

Ah — but how much reliability *can* you afford?

You can't guarantee that every e-mail message will go through. But maybe you can afford to pay for a return receipt for every message one of your users sends. At least then they'd know if the mail was going through or the system was down.

Or what about a failover system that lets your users collect their mail some other way on those rare days the BlackBerry dies? Web mail by phone, e-mail converted to text messages, iPhones for everyone — there are lots of possibilities. But they'll all cost extra. How much can you spring for? How much *should* you spring for?

That's defined by how much reliability your users actually need. And you can't know that without asking them.

And right now, you have the perfect opportunity to do just that. They've just been through a BlackBerry outage. It's been a week, so it's still fresh in their minds, but distant enough that any minor sting has faded.

So ask them: Did it cripple their work? Was it an annoyance? Did they even notice? How much of a work-around would they be willing to use to get e-mail another way next time? How much would they be willing to pay?

Don't hint at solutions or imply that you've got a magic bullet. Just ask and listen. There's a good chance they'll tell you just how much functionality and cheapness they're willing to trade off to be sure of getting their e-mail on the go.

And that's how much reliability you can afford. ■

Frank Hayes *is Computerworld's senior news columnist. Contact him at frank_hayes@computerworld.com.*

How to Protect and Improve System Performance

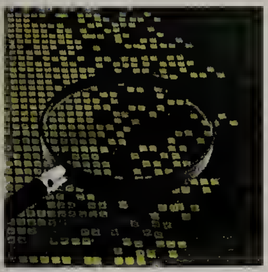
The Top Ten Points to Know about Fragmentation

IT professionals are heroes of the workplace. Whether with cunning wit or a Phillip's head screwdriver, they solve most any computer emergency. However, keeping a computer running at top speed is usually preventative maintenance instead of last-minute, adrenaline-surging, virus-vaccinating heroics.

Here are 10 key points to maintain peak performance across any network:

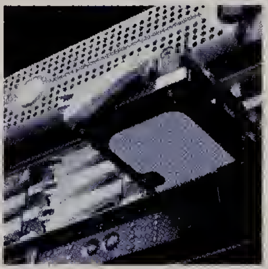
1. The hard-disk is the slowest part of any system. Say you are operating a 2.5 GHz processor. That's 2.5 billion operations every second. A large number of hard disks only spin at 7200 rotations per minute, or 120 cycles per second, or 120 Hz. This means your CPU is more than 20 million times faster than the hard disk. The hard disk still has mechanical components. Think *Terminator 2*®, when a mechanized Schwarzenegger is outclassed by the faster, smarter T-1000. When the slowest part of your computer is making unnecessary reads, the entire system is dragged down.

2. Fragmentation has severe affects. It's more than sluggish and crawling computer speeds; fragmentation leads to crashes, hangs, data errors, file corruption and boot-time failures. Files that suffer fragmentation are more difficult and take longer to back up. When systems are thoroughly defragmented, they run faster and more reliably—period.



3. Real-time defragmentation is necessary. Many companies rely on 24/7, mission-critical servers. Taking these systems offline for maintenance is not an option. But, having a server with I/O bottlenecks is also not an option. Only real-time, invisible defragmentation fixes this catch-22 situation.

4. Give your systems faster-than-new speeds. NTFS best-fit attempts for file placement on hard drives are limited. Diskeeper® 2008 comes with a new technology called I-FAAST™ (Intelligent File Access Acceleration Sequencing Technology)[1] that re-sequences your files. So, in addition to consolidating free space, defragmenting with Diskeeper boosts access to your most frequently used files by as much as 80%. I-FAAST gives systems faster-than-new speeds.



5. Servers are especially susceptible. While disk striping improves physical I/O capacity and performance, RAID and SAN systems simply do not fix fragmentation where it begins—at the file system. Enormous volumes with heavy read/write activity lead to astronomical fragmentation rates, making RAID and SAN work harder than they should. The efficiency of RAID and SAN may lessen some of the physical effects of fragmentation, but fragmentation is never eliminated. You'll need to buy more and more equipment to compensate. Sooner or later, the tortoise catches the hare, and your system suffers I/O bottlenecks and slow server speeds.

When systems are thoroughly defragmented, they run faster and more reliably—period.

6. Operate without interrupting productivity. The new InvisiTasking™ technology makes software transparent. Diskeeper 2008 with InvisiTasking will work invisibly in the background; only using untapped resources. Systems are continually improved without any management or impact on a system's usability.

7. Defragment despite minimal free space. The purpose of defragmentation is to restore lost speed and performance. A defrag engine must be able to operate in limited free space, because drives with extremely limited free space are the ones in need of the most help. Diskeeper 2008 handles millions of fragments and can function with as little as 1% free space.

8. Stop fragmentation before it happens. Diskeeper 2008 comes with Frag Shield™ 2.0, a technology that automatically defends against fragmentation of critical system files. Frag Shield 2.0 prevents crash-inducing fragmentation. It's like Superman® saving the day—two days before there's a problem.

9. Auto-defrag breathes life into systems. It keeps systems at optimum speeds and eliminates fragmentation-related performance issues. Thoroughly defragging systems adds 2–3 years onto the hardware's useful life.[2]

10. Analyze your network's performance. Poor performance on a remote system can easily be mistaken for a slow network. Get Disk Performance Analyzer for Networks™. This free utility scans networked systems for fragmentation. See for yourself how fragmentation is affecting your systems. This groundbreaking program will provide comprehensive reports on how system speeds will improve with thorough defragmentation. Visit www.diskeeper.com/cw2 and get this free, must-have utility.

Diskeeper 2008 is the only fully-automated defragmentation program. It operates invisibly in the background and it dynamically adapts defragmentation strategies to fit the needs of individual volumes.

With new defrag engines, Diskeeper 2008 restores performance on volumes with as little as 1% free space. Get rid of slows, bottlenecks, and fragmentation-induced crashes. Visit www.diskeeper.com/cw1

[1] Available on Pro Premier, Server and EnterpriseServer editions.

[2] See white paper at www.diskeeper.com/cwpaper

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[1] IDC White Paper sponsored by HP, Gaining Business Value and ROI with HP Systems Insight Manager, Doc #206761, May 2007. [2] Prices shown are HP Direct prices; reseller and retail prices may vary. Prices shown are subject to change and do not include applicable state and local taxes or shipping to recipient's address. Offers cannot be combined with any other offer or discount and are good while supplies last. All featured offers available in U.S. only. Savings based on HP published list price of configure-to-order equivalent ($3207 – $958 instant savings = SmartBuy price $2249). [3] Financing available through Hewlett-Packard Financial Services Company (HPFS) to qualified commercial customers in the U.S. and subject to credit approval and execution of standard HPFS documentation. Prices shown are based on a lease 48 months in term with a fair market value purchase option at the end of the term. Rates based on an original transaction size between $3,000 and $25,000. Other rates apply for other terms and transaction sizes. Financing available on transactions greater than $349 through April 30, 2008. HPFS reserves the right to change or cancel these programs at any time without notice. Intel, the Intel Logo, Xeon and Xeon Inside are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. © 2008 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice.